

**Comment Letter No. G1-80**

**From:** Heather K [<mailto:5gratitude55@gmail.com>]  
**Sent:** Friday, June 10, 2016 4:12 PM  
**To:** Jillian Wong <[jwong1@aqmd.gov](mailto:jwong1@aqmd.gov)>; Danny Luong <[dluong@aqmd.gov](mailto:dluong@aqmd.gov)>  
**Subject:** Opposing Approval of DEIR and Title V Permit for Tesoro and LARIC

June 10, 2016

To: Ms. Jillian Wong  
  
c/o Office of Planning, Rule Development  
and Area Sources/CEQA)

Mr. Danny Luong  
  
Senior Enforcement Manager (SCAQMD)

Re: Opposing Approval of both the Draft Environmental Impact Report (DEIR) and the Title V Permit for the Tesoro Los Angeles Refinery Integration and Compliance Project (LARIC)

Dear Ms. Wong and Mr. Luong,

As a public school teacher in Wilmington who deeply cares about the well being of my students and their families, I absolutely oppose this Tesoro project. I asked my 6<sup>th</sup> period students one day to raise their hands if they have someone in their immediate family who had suffered or is suffering from cancer. To my surprise, 15 students out of 30 raised their hands. Who in the class has a family member suffering from asthma, I asked. Twelve students raised their hands. That's whopping 40% and 50%. Have you heard of any class where almost half of the students have someone at home who has cancer or asthma? This number is scary!

G1-80.1

I went to the public hearing in the city of Carson in May and spoke against the project. One man who spoke before me said that his grandmother and aunt died of cancer even though they lived 4,000+ miles away from an oil refinery, and they never blamed anybody but themselves. I wonder if he had ever seen a classroom where up to 50% of the students had their family members suffering from asthma and/or cancer. Where does this man get the nerve to speak nonsense to people who are suffering due to a toxic environment everyday?

G1-80.2

APPENDIX G1: RESPONSE TO COMMENTS

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There are too many absentees at my school where learning for many students become almost impossible. Students have hard time focusing because they are always sick or somebody that they love at home is sick. I smell foul smell when I pull my car into the parking lot. Now, I have to fear for my own health.

G1-80.3

The DEIR and the Title V Permit (which sets permit limits) are inaccurate. They ignore Tesoro's own published plans to bring dangerous N. Dakota Bakken crude oil by rail to the Tesoro Savage Vancouver Washington ship terminal, then by ship to the Los Angeles refinery. This crude oil is particularly explosive. A Bakkan crude oil rail accident blew up an entire town in 2013, killing many people.

Just last Sunday another crude oil train in Oregon carrying this material exploded, requiring evacuation of an elementary school, and spilling oil into the Columbia River. Bakken crude also contains high levels of volatile and toxic air contaminants and the DEIR should evaluate this threat. Tesoro's Project could also bring extreme Canadian tar sands crude oil to the L A refinery through the same Tesoro Savage ship terminal. These two crude oils cause increased greenhouse gases and harms the air, land, and water during extraction, and adds an explosion risk in storage and in refineries.

G1-80.4

Now we have a small window of opportunity to redirect the environmental damages that are done to us. If we don't act quickly, recovery may never be possible. Now is the time to cut down the projects on fossil fuels and increase the development of sustainable and renewable energy sources.

No matter how much you try to appease people with safety precautions, it will never be 100% safe. Accidents are bound to happen. It is not "If." It is "When." Please think of these people as your mother, father, brother, sister, and your children and put forth your efforts in the reduction of fossil fuel, not expansion.

G1-80.5

Thank you very much for hearing my concern.

Sincerely,

Heather Kim

6<sup>th</sup> grade Math and Science Teacher

Wilmington Middle School

**Response to Comment Letter No. G1-80**

**Heather Kim**

**Comment G1-80.1**

As a public school teacher in Wilmington who deeply cares about the well being of my students and their families, I absolutely oppose this Tesoro project. I asked my 6<sup>th</sup> period students one day to raise their hands if they have someone in their immediate family who had suffered or is suffering from cancer. To my surprise, 15 students out of 30 raised their hands. Who in the class has a family member suffering from asthma, I asked. Twelve students raised their hands. That's whopping 40% and 50%. Have you heard of any class where almost half of the students have someone at home who has cancer or asthma? This number is scary!

G1-80.1

**Response G1-80-1**

The comment regarding opposition to the proposed project does not raise issues related to the proposed project or the DEIR. The comment is noted and no response is necessary under CEQA.

As explained in Master Response 3, the DEIR fully analyzed and disclosed the proposed project's potential health impacts from all pollutants. The proposed project's potential cancer and non-cancer human health impacts, including asthma and other respiratory illnesses, were analyzed in the DEIR, and determined to be less than significant. The estimated cancer risk due to the operation of the proposed project was found to be less than the SCAQMD's cancer risk significance threshold of ten in one million (see FEIR Section 4.2.2.5). The non-cancer chronic and acute hazard indices were found to be below the SCAQMD's non-cancer chronic and acute hazard index threshold of 1.0. Therefore, the proposed project is not expected to cause a significant adverse health impact.

**Comment G1-80.2**

I went to the public hearing in the city of Carson in May and spoke against the project. One man who spoke before me said that his grandmother and aunt died of cancer even though they lived 4,000+ miles away from an oil refinery, and they never blamed anybody but themselves. I wonder if he had ever seen a classroom where up to 50% of the students had their family members suffering from asthma and/or cancer. Where does this man get the nerve to speak nonsense to people who are suffering due to a toxic environment everyday?

G1-80.2

**Response G1-80.2**

The comment regarding the speakers at the public hearing on the Title V permit and public meeting on the DEIR held on May 17, 2016 does not raise issues related to the proposed project or the DEIR. The comment is noted and no response is necessary.

**Comment G1-80.3**

There are too many absentees at my school where learning for many students become almost impossible. Students have hard time focusing because they are always sick or somebody that they love at home is sick. I smell foul smell when I pull my car into the parking lot. Now, I have to fear for my own health.

G1-80.3

**Response G1-80.3**

This comment refers to absences and illnesses of students. It is assumed that this comment refers to existing exposures to air pollution by the students. See Response G1-80.1 for information on this issue.

The proposed project does not introduce any potentially odor-causing chemicals that are not already used in the Refinery. All new and modified equipment will comply with Best Available Control Technology (BACT) for air pollutant emissions control. See Master Response 11 for an explanation of odors associated with proposed project.

The comment does not raise specific issues related to the DEIR. The comment is noted and no further response is necessary.

**Comment G1-80.4**

The DEIR and the Title V Permit (which sets permit limits) are inaccurate. They ignore Tesoro's own published plans to bring dangerous N. Dakota Bakken crude oil by rail to the Tesoro Savage Vancouver Washington ship terminal, then by ship to the Los Angeles refinery. This crude oil is particularly explosive. A Bakkan crude oil rail accident blew up an entire town in 2013, killing many people.

Just last Sunday another crude oil train in Oregon carrying this material exploded, requiring evacuation of an elementary school, and spilling oil into the Columbia River. Bakken crude also contains high levels of volatile and toxic air contaminants and the DEIR should evaluate this threat. Tesoro's Project could also bring extreme Canadian tar sands crude oil to the L A refinery through the same Tesoro Savage ship terminal. These two crude oils cause increased greenhouse gases and harms the air, land, and water during extraction, and adds an explosion risk in storage and in refineries.

G1-80.4

**Response G1-80.4**

As explained in Section 4.1.2.5 of the DEIR and Master Response 8, the Vancouver Energy Project is wholly independent from the proposed project and is undergoing separate environmental review by the Washington State EFSEC, which includes the evaluation of transportation hazards. Additionally, as described in Master Response 8, the Final EIS has not yet been issued for the Vancouver Energy Project, and the project has not been approved.

As explained in detail in Sections 2.5.3 and 2.5.4 and Appendix F of the DEIR, Master Response 4, and Response G1-78.94, the Refinery is currently processing a blend of various crude oils and will continue to do so with or without the proposed project. The proposed project will not change the crude oil blend processed by the Refinery except to the extent that the DCU H-100

heater permit revisions may allow the processing of a slightly heavier crude oil blend (see Master Response 4; FEIR sections 2.7.1.3 and 4.1.2.1).

The DEIR analyzed the potential increase in crude oil processing of up to 6,000 bbl/day associated with the modification of the DCU H-100 heater permit description. The increase in crude oil processing rate is not related to any specific crude oil source. Master Response 4 explains that the Refinery's sources of crude oils have and will continue to vary with or without the proposed project. By using worst-case crude oil properties (see Response G1-78.157), the DEIR fully analyzed the potential impacts associated with storing various crude oils in the new and replacement storage tanks and with transferring various crude oils via the associated piping. There would be no additional impacts, beyond those analyzed in the DEIR, for the new and replacement storage tanks if different light or heavy crude oil is processed at the Refinery (see Section 4.2.2.2 of the FEIR). The proposed project does not facilitate or encourage sourcing crude oil from any particular location. In other words, the improved offloading efficiency provides a benefit regardless of the type of crude oil transported by marine vessel.

Light and heavy crude oil is currently delivered, stored, and processed at the Refinery and will continue to be delivered, stored, and processed with or without the proposed project. The impact analysis in the DEIR accounts for the variety of crude oils that have been and will be handled by the Refinery. For example, the TAC concentrations of crude oils in storage tanks associated with the proposed project were based on a worst-case hybrid analysis of the toxic content of the crude oils currently and potentially processed at the Refinery, including Bakken and heavy Canadian crude oil. The hybrid TAC speciation was prepared by selecting the highest concentration of each toxic compound from the entire speciated data set of all the crude oils analyzed.

There have been previous volatility issues associated with the transport of Bakken crude oil. However, regulations have since been adopted that require a reduction in volatility of Bakken crude oil that is transported. For example, on December 9, 2014, the Industrial Commission of North Dakota issued Order 25417 regarding conditioning of Bakken crude oil and limiting the RVP of crude oil provided for transport to 13.7 RVP. Thus, Bakken crude oil transported to the West Coast will be pipeline quality (i.e., qualified for safe transport) and will not have as high a vapor pressure as the Bakken crude oil produced at the wellhead. As with other U. S. crude oil production operations, the Order adopted by the State of North Dakota will require that crude oil production facilities remove a significant portion of the light ends (ethane, propane, butane and pentane) prior to offering the crude oil for shipment to refineries for processing.

Because of Bakken crude oil's purported volatility, concerns were raised in the media as to whether Bakken crude oil was properly classified as a Class 3 hazardous material under U.S. DOT regulations. A Class 3 hazardous material is generally a flammable or combustible liquid that does not meet the regulatory classification requirements for other hazardous characteristics, such as toxicity, corrosivity, radioactivity or explosiveness. However, those concerns have since been resolved by repeated analysis and testing that demonstrates Bakken crude oil to be a Class 3 hazardous material, similar to other light sweet crude oils. After considering the information, the PHMSA Deputy Administrator testified to Congress that Bakken crude oil is accurately

classified as a Hazard Class 3 Flammable Liquid.<sup>246</sup> This is consistent with the sampling and testing Tesoro has completed on Bakken crude oil. Therefore, Bakken crude oil has properties similar to other light crude oils, and is not classified as explosive.

As explained in subsequent responses, which are listed in Table 78-94.1, Bakken and heavy Canadian crude oils are similar to other light and heavy crude oils currently processed by the Refinery. As described in Master Response 4, and Response G1-78.150, in the future, as now, any Bakken or heavy Canadian crude oils processed would have to be combined with other crude oils to create a crude oil blend that matches the Refinery's processing capabilities and permit limitations. This is what has occurred with Bakken, heavy Canadian, and many other heavy and light crude oils that were utilized in the baseline period, and is what will continue after implementation of the proposed project. Providing "advantaged crude oil", as that term is used by Tesoro, to Tesoro refineries, including the Los Angeles Refinery, is occurring independent of the proposed project. Because crude oils are blended to meet the Refinery limitations and specifications, the Refinery may continue to receive "advantaged crude oil", without modifying its crude oil processing units, storage facilities or transfer operations. Any increased use of Bakken or heavy Canadian crude oils at the Refinery would not be caused by the proposed project. The proposed project's impacts were analyzed in detail using worst-case assumptions (e.g., the maximum vapor pressure of crude oil allowable by SCAQMD rules), which accounts for any impacts from increased use of Bakken or heavy Canadian crude oil. Response G1-78.111 specifically addresses crude oil corrosivity. Responses G1-81.65 and G1-81.67 address greenhouse gases and crude oil production.

The comment also refers to derailment of a train carrying Bakken crude oil in Mosier, Oregon and another unidentifiable derailment. As explained in Response G1-81.57, there are no proposed project modifications to bring crude oil by rail to the Refinery. Thus, the Mosier derailment and other derailments are not relevant to the DEIR analysis or the proposed project.

Responses G1-81.65 and G1-81.67 explain that the DEIR does not need to analyze the environmental impacts from crude oil production because the proposed project will not cause any changes to that industry.

The FEIR fully analyzed the potential impacts of the proposed project with respect to greenhouse gas emissions in Section 5.2.2.3 and hazards in Section 4.3.2.

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<sup>246</sup> Written statement of Timothy P. Butters Before the Subcommittees on Energy and Oversight Committee on Science, Space and Technology, U.S. House of Representatives at page 12 (Sept. 9, 2014).

**Comment G1-80.5**

Now we have a small window of opportunity to redirect the environmental damages that are done to us. If we don't act quickly, recovery may never be possible. Now is the time to cut down the projects on fossil fuels and increase the development of sustainable and renewable energy sources.

No matter how much you try to appease people with safety precautions, it will never be 100% safe. Accidents are bound to happen. It is not "If." It is "When." Please think of these people as your mother, father, brother, sister, and your children and put forth your efforts in the reduction of fossil fuel, not expansion.

G1-80.5

**Response G1-80.5**

The proposed project further integrates the two existing Carson and Wilmington Operations enabling the shutdown of the Wilmington FCCU and resulting in local emission reductions. See Section 2.7 of the DEIR and Master Response 7, which describe the scope of the proposed project and explain that the proposed project is not an expansion of the Refinery.

The comment does not raise any issues on the proposed project or the DEIR; therefore, no further response is necessary under CEQA.

**Comment Letter No. G1-81**

**Report on the  
Proposed “Tesoro Los Angeles Refinery  
Integration and  
Compliance Project” (LARIC)  
Draft Environmental Impact Report and Title V Permit**

Comments of Julia E. May,  
Senior Scientist, CBE  
June 10, 2016



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**ACRONYMS**

**AQMD / SCAQMD** – Air Quality Management District or South Coast Air Quality Management District

**BBLs** – Barrels (This is a standard abbreviation with a long history.)

**BPD** – Barrels per day

**CO<sub>2</sub>E** – Carbon Dioxide equivalent (which includes not only CO<sub>2</sub>, but other Greenhouse Gases including methane). The methane and others are weighted more heavily, since they are more potent GHGs.

**DCU** – Delayed Coker Unit

**DEIR** – Draft Environmental Impact Report

**FCC or FCCU** – Fluid Catalytic Cracking Unit (which breaks longer hydrocarbons into medium sized liquid molecules like gasoline, diesel, and jet fuel)

**GHGs** – Greenhouse Gases

**H<sub>2</sub>S** – Hydrogen Sulfide

**LPG** – Liquefied Petroleum Gas

**NO<sub>x</sub>** – Nitrogen Oxides

**PM<sub>10</sub> / PM<sub>2.5</sub>** – Particulate Matter (10 and 2.5 micron). These are small particles that can penetrate deep into lungs.

**PRDs / PRVs or PSDs / PSVs** – Pressure Relief Devices or Valves, or Pressure Safety Devices or Valves

**PSTU** – Propane Storage and Treatment Unit

**ROG** – Reactive Organic Gases (VOCs)

**SARP** – Sulfuric Acid Regeneration Plan

**SO<sub>x</sub>** – Sulfur Oxides

**VOCs** – Volatile Organic Compounds

**I. Introduction and Summary –Tesoro LARIC DEIR and Title V permit deficiencies need correction**

This report provides my expert opinion of the Tesoro Los Angeles Refinery Integration and Compliance Project (the “Project”) Draft Environmental Impact Report (DEIR) and Draft Title V Permit, distributed by the South Coast Air Quality Management District (AQMD) in March 2016 for public comment.<sup>1</sup> I am a Senior Scientist at Communities for a Better Environment (CBE). For over 25 years I have provided engineering evaluation of oil refinery and oil industry permitting and regulatory development, impacts, and pollution prevention options and alternatives, on projects in California, Michigan, Illinois, Indiana, Oregon, N. Dakota, Texas, and Washington, as a consultant to various organizations and agencies, and as a CBE staff member. I have also evaluated impacts and causes of dozens of oil refinery accidents and releases and personally witnessed many.

G1-81.1

**This Project is one of the most extensive seen in the South Coast**, merging Tesoro’s Wilmington and Carson California refineries into the largest refinery on the West Coast (380,000 barrel per day),<sup>2</sup> including the following (see sections later for details and citations):

- Expansion of the Carson FCCU (Fluid Catalytic Cracking Unit) and Hydrocracking Unit to accommodate feed from shutting down the Wilmington FCCU as part of integration, and increased utilization of regenerators, cogeneration units, and incinerators;
- New Propane Storage and Treatment Unit, expanded rail for LPG delivery (Liquefied Petroleum Gas), Sulfuric Acid Regeneration Plant, Wet Jet Treater, and many hydrotreaters (for removing hazardous sulfur contamination);
- At least a dozen new pressure relief device connections to refinery flares;
- New or increased use of at least 22 heaters and boilers (which are major drivers of oil refinery processes, air pollution sources, and energy use), and shutdown of 6 Wilmington FCCU heaters;

**Construction of an unprecedented volume of 8 new crude oil storage tanks totaling 3.4 million barrels (bbls) of volume, with about 420,000 bbls/day in increased throughput**, plus expanded use of many existing tanks. The new tank throughput alone is greater than the current daily crude oil use at the entire Tesoro LA refinery complex.<sup>3</sup>



**Photo of part of a 500,000-bbl tank**  
<http://www.bloomberg.com/news/articles/2012-09-27/the-oil-hub-where-traders-are-making-millions>

G1-81.2

<sup>1</sup> South Coast Air Quality Management District (AQMD), available at: <http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents--year-2016>

<sup>2</sup> 380,000 bpd is Tesoro’s figure of maximum capacity; <http://tsocorp.com/refining/los-angelescalif/>; the DEIR differs in calling it a 363,000 bpd refinery, for example at p. 2-17.

<sup>3</sup> (153 million bbls/year)/365 days/year=419,000 bbls/day on average, compared to the Tesoro Wilmington and Carson Refineries (LA refinery complex), which Tesoro states has a full capacity of 380,000 bbls/day crude oil.

**According to the DEIR, the Project would:**

- **Have mostly neutral impacts on air emissions** but increase VOCs and decrease CO (it would be neutral for GHGs, NOx, SOx, and Particulate Matter,<sup>4</sup> due to both use and generation of air pollution credits to be later used by Tesoro or others companies to offset expansions), and
- **Significantly increased risk of explosion and toxic release** (from LPG rail unloading, the Hydrocracker, Catalytic Reforming Unit (CRU), Propane Sales Treating Unit (PSTU), and Sulfuric Acid Recovery Plant (SARP)<sup>5</sup>).

G1-81.3

**This report finds DEIR deficiencies requiring correction including added impacts:**

- **2016 Tesoro investor statements and other expert reports contradict the DEIR, and identify a broader project purpose** to increase the Tesoro LA refinery competitive advantage, connect West Coast assets, bring cheap crude to LA through the Tesoro Savage Vancouver Washington rail to ship terminal, in addition to increase flexibility between gas and distillate production and integrate the Wilmington and Tesoro refineries
- **Tesoro’s baseline crude oil slate was undisclosed and can change substantially due to this Project**, especially through the import of N. Dakota Bakken crude oil emphasized in Tesoro’s plans. Tesoro also has options to transport substantial Canadian crude oil, and to blend Bakken and Canadian crude to replace Alaska North Slope and California crude oil

**Strategic Investments for Distinctive Value**

- **Creating advantage through integration**
  - Los Angeles Refinery Integration and Compliance Project
- **Changing the West Coast crude oil supply dynamics**
  - Vancouver Energy Project
- **Capturing higher margins in a high growth market**
  - West Coast Mixed Xylenes Project
  - Anacortes Isomerization Project



**Rail Costs to Clear Bakken**



G1-81.4

- **The Project would include transporting new crudes from the N. Dakota Bakken and potentially Canadian tar sands by rail to Vancouver Washington, then by ship to the massive new storage tanks**, and could involve third party business and exports, as well as use within the two refineries making up the LA refinery complex.
- **Plans for introduction of large imports of Bakken crude oil to the refinery, cause new risks** starting with extraction by fracking, rail transport, ship transport, storage, blending, and refining, including GHGs, toxic and criteria pollutant emissions and harms to underground water supplies during extraction, explosions during transport, waxy deposits

<sup>4</sup> DEIR, for example at p. 4-17 to 4-18  
<sup>5</sup> DEIR, for example, pp. 4-45 to 4-47

in railcars, ships, storage tanks, pipes, and refinery vessels requiring chemical dispersants and hazardous waste requiring disposal, coking during processing and when blended with heavier crudes, and introducing additional volatile toxic air contaminants including benzene.



<http://www.kgw.com/news/photos-train-derailment-in-the-gorge/230445267>

G1-81.4  
cont'd.

- Potential substantial additions of Canadian crude oil to the refinery, introduces additional new risks,** starting with extraction, transport, storage, blending, and then refining, including strip mining land and generation of toxic lakes, addition of volatile diluents during transport, crude by rail transport risk, extremely heavy and high sulfur content producing heavy sludge in storage vessels and requiring additional energy to desulfurize, crack, and coke, causing additional GHG, criteria, and toxic emissions.

G1-81.5

- Project elements have the potential for much higher emissions and impacts** due to the extraordinary storage tank expansion, expansion of desulfurization equipment, extensive heater, boiler, and incinerator expansion (about 22), at least a dozen new connections of equipment to flares, new railcar imports of liquefied petroleum gas, and more.

G1-81.6

- Tesoro flaring emissions are already large and could substantially increase,** due to new pressure relief connections to the flares which have the potential to increase emissions from hundreds to thousands of pounds per day in VOC, SOX, and other criteria pollutant emissions, but which were counted as zero, despite permits directing burning gases in flares, and since gases have no place to go during planned and unplanned shutdowns.



G1-81.7

- Heater and Boiler use would be greatly expanded, but was found in some cases to decrease emissions despite maximum heat input limits increasing,** without a clear basis, sometimes leaving out best technology assessment.
- Pipeline spills have a greater potential and the DEIR should add evaluation,** and the status of the pipeline expansion from 12 to 42 inches proposed in 2014, and connections of miles of pipelines of Tesoro acquisitions to the airport and other locations should be disclosed and evaluated.

G1-81.8

G1-81.9

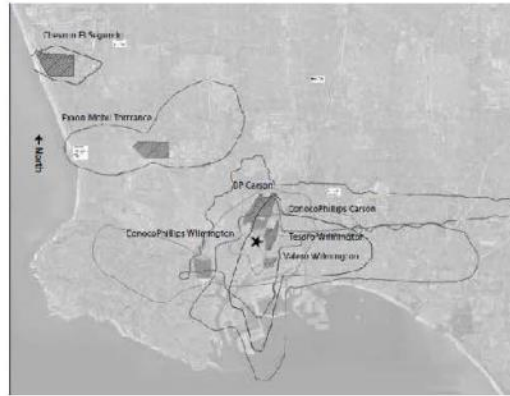
- The Project should not take credit for the FCCU shutdown,** because the State of California approved the Tesoro purchase of BP Carson despite anti-competitive concerns based on this and other environmental improvements

G1-81.10

- **Special attention is needed for earthquake and related fire risks due to the Project** because of the large new storage tanks, pipeline expansions, LPG by rail, increased risk of hazardous chemical release.

G1-81.11

- **Cumulative Impacts should be changed to significant because the DEIR impermissibly took credit for large emissions reductions from the SCIG (Southern California International Gateway) project** even though the AQMD won a challenge that resulted in the SCIG EIR being invalidated in court. The AQMD website also describes this project as having increased emissions that impact many communities, rather than providing emissions reductions.



G1-81.12

Cumulative or piecemealed impacts of extensive interrelated projects and issues in the region and additional issues should be identified and evaluated including:

- 16 miles of pipelines, storage, and export of fuels to Los Angeles International Airport,
- Modifications and interrelation with Tesoro Logistics operations (since Tesoro sold many facilities for gathering, moving, storing, and distributing petroleum inputs and products to Tesoro Logistics, and since company literature identified synergies between Tesoro refining and Tesoro Logistics),
- Hydrogen production from companies such as Air Products that sell to Tesoro,
- Evaluation of San Pedro butane tanks relation to the Tesoro Project.

- **The Environmental Justice (EJ) setting and implications of all the above Project and Cumulative impacts require much more attention and compliance with AQMD and EPA EJ policies,** given the disproportionate burden due to the heavy industrialization in the area and the high levels of asthma and other health impacts

**Minding the Climate Gap - Top 10 Facilities Polluting Disproportionately in Communities of Color**

Rank	Facility Name	City
1	BP Carson Refinery	Carson
2	Tesoro Wilmington Refinery	Wilmington (Los Angeles)
3	Paramount Refinery	Paramount
4	ConocoPhillips Wilmington Refinery	Wilmington (Los Angeles)
5	ExxonMobil Torrance Refinery	Torrance
6	Chevron Richmond Refinery	Richmond
7	Malburg Generating Station (Vernon Power Plant)	Vernon
8	ConocoPhillips Carson Refinery	Carson
9	Valero Wilmington Refinery	Wilmington (Los Angeles)
10	California Portland Cement Company Colton Plant	Colton

G1-81.13



**Summary of recommendations for necessary DEIR additions** (detailed in this Report):

**The DEIR should provide baseline data and projected changes including:**

- The crude oil slate (specific crude oil use and characteristics), throughput, and storage in specific tanks, including Bakken and Canadian crudes,
- The total refinery, distillation unit, and coker daily throughput,
- Sales of Tesoro LA refinery fuels inside and outside California, and outside the U.S.,
- Desulfurization capability and sulfur mass,
- DCU Heater H-100 and other project heaters daily and annual heat input and emissions,
- Third party transfers including Tesoro LA refinery products ultimately stored in San Pedro butane tanks, hydrogen purchases by Tesoro (Air Products and other), Tesoro product exchanges with Tesoro logistics, the Los Angeles Airport, and others.
- Marine terminal crude delivery by ship volume, characteristics, and projected changes

G1-81.14

**The DEIR should also evaluate the following and make corrections:**

- A complete Environmental Justice evaluation of the human and environmental setting, and potential increased burden due to the additional impacts listed below
- The full potential to emit due to flare emissions during planned and unplanned shutdowns, maintenance, “essential operating needs” allowed by the AQMD Rule 1118.
- Corrected heater emissions showing increased emissions with increased utilization.
- Corrected Project emissions by subtracting FCCU shutdown emissions, previously required by the State of California.
- Evaluation of potential local impacts due to use of Bakken and Canadian crudes in the refinery including increased corrosion, explosion risk, benzene, hydrogen sulfide, other toxic components and byproducts of processing crude oil, increased processing hazards due to increased paraffin introduction, and increased GHGs.
- Potential out of state cumulative impacts due to importing Bakken crude oil and potentially Canadian tar sands crude, including extraction impacts such as GHGs, land, air, and water impacts, and transportation risks.
- GHG emissions due to third parties importing additional hydrogen to the refinery, potential for additional hazards at the San Pedro storage tanks, due to increased use of LPG at the refinery, and hazards due to spills from potential increased ship size
- Interconnection and cumulative impacts of the Tesoro LA refinery with other Tesoro facilities that transfer petroleum materials, including Tesoro Logistics and others

G1-81.15

**Additional Alternatives to the Project pooling at least the following public recommendations on safety and lower emissions should be evaluated, including:**

- No increased refinery crude throughput
- No storage tank expansions,
- No Bakken or Canadian crude oil in the refinery, set by a permit condition,
- No increased hazards (including from LPG, railcars, H2S, Sulfuric Acid Regeneration Plant, Wet Jet Treater, and many hydrotreaters),
- Additional emissions reductions in the refinery to offset potential increases from flaring, heaters, other sources, and the crude switch.

G1-81.16

- Evaluation of zero carbon alternative energy mitigation measures included to some extent in the 2014 Chevron Modernization Project Revised DEIR, and others

G1-81.16  
cont'd.

**Draft Title V Permit comment summary:**

I reviewed the Draft Title V Permit, attached AQMD calculations, and many associated permit applications. In this case the draft permit covers only a subset of the many DEIR Project components, with more pieces of the DEIR Project to be submitted for permits by Tesoro later. For instance, the DEIR tank expansion is not currently part of the Draft Title V Permit, and the District has explained that it has not yet received an application for permits for them.

The Title V permit must await approval until the environmental review (EIR process) is completed, because, for example, the DEIR looks at alternatives to the Project, and the Project could change after the DEIR process.

G1-81.17

Much of this report describes Project deficiencies in terms of DEIR issues, however, because many of these issues are cross-cutting with the draft Title V components, I am submitting this report as comments on the Draft Title V permit as well as on the DEIR. For example, I discussed the Draft Title V Permit covers heater expansions and additional pressure relief device connections in the DEIR context. These should also be considered comments on the Title V Draft Permit, because additional emissions are not fully identified, and permit conditions are not set to preclude these emissions. **Emissions reductions and permit conditions should be added addressing these missing emissions increases.**

In addition, the switch to different crude oils (Bakken, and potentially Canadian Tar Sands) is not acknowledged as part of the Project in either the DEIR or the Title V discussion. This is a far reaching change, so impacts of this switch which would impact equipment throughout the refinery are missing from the Title V evaluation. **If the Title V changes leave out discussion of the crude oil switch, then permit conditions should be set prohibiting increased use of Bakken or Canadian crude oil above baseline levels, with data provided establishing this baseline.**

G1-81.18

Furthermore, because much baseline data is missing and the increases above the baseline have a large potential for significant increased emissions due to this project, the Title V permit conditions cannot be considered sufficient to prevent these increases.

G1-81.19

**II. Tesoro's stated purpose to investors is competitive advantage, connecting West Coast assets, bringing price-advantaged crude to LA through Vancouver Washington, and increasing flexibility for gasoline and distillate tradeoff**

This section identifies inconsistencies and flaws in the DEIR regarding the fundamental nature of the Project, showing conflicts between Tesoro officials' statements, and DEIR statements, in the refinery size, especially regarding a switch to different crude oils that have many new impacts, and other Project Description flaws that relate to significant impacts.

G1-81.20

Because of clear, and stated connections and plans of the Tesoro corporation regarding the switch to bring a large portion of N. Dakota Bakken (and potentially a substantial volume of Canadian crude) to the Tesoro LA refinery, both Tesoro and the environmental review process (first the Negative

Declaration, now the DEIR), lose credibility in continuing to deny any connection to the Project. This reality needs to be simply stated, and evaluated. Mitigation, alternatives, and permit conditions should be proposed. If not, permit conditions should be set requiring that no Bakken crude oil or Canadian crude oil will be allowed in the new tanks or freed up capacity in existing tanks.

G1-81.20  
cont'd.

**A. Even the size of the refinery is in question, and has major undisclosed impacts**

The DEIR states:

*“The total crude oil rate capacity for the Los Angeles Refinery is 363,000 bbl/day.”*<sup>6</sup>

Tesoro on the other hand states:

*“The Los Angeles refinery is the largest refinery on the West Coast and is a major producer of clean fuels. At full capacity, it operates at 380,000 barrels per day (bpd).”*<sup>7</sup>

This is a major difference in description of a basic and fundamental refinery characteristic – its size. This impacts all aspects of the Project, since the refinery takes the crude oil, separates components in the distillation units, then cracks a portion of this, sends a portion to the cokers, alkylates portions, reforms portions, hydrotreats high sulfur portions, blends portions, etc. This means that everything in the refinery could be processing larger volumes than the DEIR has evaluated, and it begs the questions:

- Has the refinery already increased its throughput before it received approval?
- Why does the DEIR identify a potential increase from 363,000 bpd, plus 6,000 bpd (ostensibly to 369,000 bpd identified in the DEIR), when Tesoro has aims to reach a higher refinery throughput level of 380,000 bpd
- If Tesoro will be increasing from 363,000 bpd to 380,000 bpd, what other changes will occur in the refinery?
- Are there intermediate products imported to the refinery, where do they come from, what are they, and are they part of this size discrepancy?

G1-81.21

Generally, oil refinery capacity is described in terms of the amount of crude oil processed first in distillation units at the refinery front end. Crude oil is the main source of inputs at the refinery, but it is also common for oil refineries to purchase some amount of intermediate product that can be input downstream of distillation units.

This could mean that the Project will increase from 363,000, to 380,000, which is 17,000 additional barrels per day, almost three times the described increase of 6,000 barrels (which is in itself a significant increase). The DEIR cannot proceed until the basic facts of refinery size are identified. The implications are numerous, and too far reaching to assess in the allotted comment period, so the DEIR needs to be corrected. This will require documentation of the baselines of the individual

<sup>6</sup> DEIR at p. 2-17, emphasis added

<sup>7</sup> Los Angeles Refinery Fact Sheet 2016, Tesoro, <https://tsocorpsite.files.wordpress.com/2016/04/tesoro-los-angeles-fact-sheet.pdf> emphasis added, Attachment 1

Wilmington and Carson crude and intermediate product inputs from before the purchase of BP Carson by Tesoro, to the present.

CBE asked Tesoro representatives about the difference between the discrepancy. Tesoro representatives stated that the refinery size has to do with the rated capacity and reporting to government entities, using the Solomon evaluation for sustained operating rate.<sup>8</sup> The DEIR should provide this data, and publicly establish the baseline used, and the potential increase in crude oil throughput for the Project.

G1-81.21  
cont'd.

**B. Tesoro's 2016 investor statements run counter to the DEIR, which incorrectly accepts Tesoro's Public Relations Project Descriptions without investigation**

Despite Tesoro's stated purpose to investors, the DEIR shows a disappointing avoidance of the overwhelming and straightforward evidence regarding this key Project element: -- the crude oil switch. This is a stated, fundamental basis for the Project, according to Tesoro's own consistent statements from 2013 to the present (when Tesoro officials speak outside the DEIR proceedings).

In contrast, *other* Tesoro officials, when speaking in the context of the DEIR process where Tesoro seeks Project approval, Tesoro describes the Project purpose as reducing emissions, and making the refinery more efficient (at the AQMD public hearing May 17th, in written Public Relations documents, and in community meetings).

Unfortunately, the DEIR description follows suit, and its conclusions are more in line with Tesoro's public relations descriptions, rather than providing an unbiased and independent investigation required by California environmental laws in the DEIR. It states: "*While the proposed project does not affect the types of crude oils processed at the Refinery and, thus, will not have impacts due to changes in crudes, the proposed project may increase downstream unit processing rates on a monthly or daily basis.*" (for example at p. 4-2)

G1-81.22

Tesoro statements to investors, unlike the DEIR, describe the Los Angeles refinery Project, the crude oil switch, and the Vancouver Energy project as follows:

**"When you think about formalizing competitive advantage and fully integrating our value chain, that is really what the Los Angeles Integration and Compliance Project is about. And when we think about creating value, we are not just thinking about advantaged crude oils in front of our refineries, but we're thinking about how that supply to the west coast of advantaged crude oils can change the shape of the crude oil supply/demand dynamics for the west coast. And that's what we are trying to accomplish through Vancouver Energy."**<sup>9</sup>

In contrast, the DEIR states: "*The type of crude oil and feedstocks will not change as part of the proposed project. Crude oil and oil feedstocks are currently obtained from a variety of sources based on factors such as product availability and market conditions.*" (For example, DEIR at p. 2-2) The fact that crude oil and feedstocks are obtained from a variety of sources according to market

<sup>8</sup> 6/1/2016 meeting of CBE and Tesoro by telephone and webex presentation of Tesoro LARIC project.

<sup>9</sup> Edited Transcript TSO - Tesoro Corporation 2015 Analyst and Investor Day, December 09, 2015, p. 10, available at <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> Attachment 2

conditions is true, but irrelevant to the fact that Tesoro has stated plans to change the crude, build large crude storage tanks, and make other changes as part of the Project which have major impacts.

Many Tesoro 2016 statements to investors directly connect the LA Refinery integration project with its West Coast crude oil supply project – the Vancouver Energy Project, and identify this as the most efficient route to the West Coast for Bakken crude oil, including these Tesoro slides:<sup>10</sup>

### Strategic Investments for Distinctive Value

- **Creating advantage through integration**
  - Los Angeles Refinery Integration and Compliance Project
- **Changing the West Coast crude oil supply dynamics**
  - Vancouver Energy Project
- **Capturing higher margins in a high growth market**
  - West Coast Mixed Xylenes Project
  - Ansanities Isomerization Project



### Supplying Advantaged Crude Oil to the West Coast

**Vancouver Energy Project**

- Joint venture with Savage Companies
- Up to 360 MSD Rail to Marine Terminal
- Most efficient route to West Coast for Bakken crude oil
- Significant infrastructure exists; low development cost

**Strategic Crude Supply**

- Increases West Coast competitive crude supply
- Relative refining values of \$3 to \$5 per barrel

**Logistics Growth**

- Potential assets for offer to TLLP
- Tesoro a major, dedicated customer
- Significant third party revenue



**Estimated Project Details**

- CAPEX \$200 million<sup>1</sup>
- EBITDA \$100 million<sup>2</sup>
- Tesoro IRR 40%+

G1-81.22  
cont'd.

Other Tesoro Project Descriptions differ according to audience.

- **Tesoro’s Public Description:** Emphasizes “Cleaner More Efficient Operations”<sup>11</sup>
- **Investors Description:** Emphasizes competitive advantage of connecting assets and moving crude oil on the West Coast

G1-81.23

**But the DEIR does not find the same air quality benefits as Tesoro:** The DEIR finds the Project will also increase VOCs, and have no benefit for NOx, SOx, particulate matter, and Toxic Air Contaminants, but would cut CO emissions.<sup>12</sup> (Furthermore, this report finds that the DEIR has also underestimated true Project impacts.)

G1-81.24

<sup>10</sup> Tesoro Presentations webpage, weblink: Morgan Stanley Corporate Access Day, 5/12/16, Slideshow entitled: *Driven to Create Value, Morgan Stanley Refining Corporate Access Day, May 2016*, Slide 13 &15, available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> , Attachment 3

<sup>11</sup> <http://www.tesorolaproject.com/aboutlaric/>

<sup>12</sup> DEIR at pp. 4-17 to 4-18

<b>Tesoro Public Relations Project Purpose description:<sup>13</sup></b>
<p>“Tesoro plans to invest \$460 million to physically connect, further integrate and upgrade our adjacent Carson and Wilmington facilities, so that our combined Los Angeles Refinery operates more cleanly and efficiently.</p> <p>“Pending permitting and approvals, the Los Angeles Refinery Integration and Compliance (LARIC) project will improve air quality, substantially reduce local emissions, upgrade refinery equipment and provide significant benefits to the local economy.”</p>
<b>Contrasts with Tesoro description to investors regarding new crude oil access:<sup>14</sup></b>
<p>“When you think about our portfolio, with almost 740,000 barrels a day of capacity on the west coast, we have a very large and competitive position . . . four excellent refineries with just absolutely superb waterborne logistics connectivity, <b>so not only for crude oil, advantaged crude oil access up and down the coast . . .</b></p> <p><b>“This is the Los Angeles Integration and Compliance Project, and, boy, it has been a pleasure. . . . this business is performing very, very well this year and it is going to contribute -- that region will contribute onwads of \$2 billion of revenue to our 2015 results</b></p> <p>“. . . And then, we do two large pipelines, 45-inch bores going under two major transportation corridors, and I think all totaled it is something like 18 miles of pipe that we are putting in in these projects that will formally connect and unleash the full power of a full integrated site, and that's the exciting thing about this project.</p>

G1-81.23  
cont'd.

The clear underlying reason for the Project is for the unsurprising purpose of increasing Tesoro profits, including access to cheaper crude oils to use in its integrated refinery. While reducing CO emissions, other emissions will increase (such as VOCs), and many impacts were not evaluated. It is important to clearly state the actual reason for the Project purpose and activities, in order to gain a clear understanding of actual impacts. The DEIR tends to skirt these issues or ignore Tesoro investor statements.

G1-81.24  
cont'd.

In my 2014 report on Tesoro’s Negative Declaration, I quoted similar statements, by Tesoro, and available in oil industry literature, regarding Tesoro’s plans. These include connecting its LA refineries to crude oil from the Bakken region and from Canadian tar sands, especially through the Tesoro Savage Washington crude-by-rail to ship terminal, because of the cost advantage:

<sup>13</sup> <http://www.tesorolaproject.com/aboutlaric/> In addition to multiple Tesoro community presentaitons in 2016

<sup>14</sup>Edited Transcript TSO - Tesoro Corporation 2015 Analyst and Investor Day, December 09, 2015, previously cited and attached, at p. 8, 11

Morningstar report, July 2013:<sup>15</sup>

Specifically, Tesoro can dramatically improve the performance of Carson by optimizing its crude slate with light crude from the Bakken. . . .

Tesoro should gain further advantages from integrating Carson with the Wilmington refinery.

**Increasing throughput of light and heavy discount crude from the Mid-Continent and Canada via rail will likely benefit Tesoro more, though.** To this end, Tesoro recently entered an agreement to develop a 120 mb/d crude by rail and marine facility in Washington. *[This was expanded to 360,000 bbls/day<sup>16</sup>]*

Tesoro February 2014 slideshow:<sup>17</sup>

**“Extending the advantaged crude oil to the West Coast,”** and changing the Los Angeles operations crude oil feedstock from 15% California Heavy crude to **“Potentially up to 50% California Heavy and Bakken”** crude oil (Slide 13).

“Terminaling, Transportation, and Storage” will “Consolidate Tesoro volumes in Southern California distribution system” and “Open Southern California to third-party business” (Slide 13)

My 2014 report is attached<sup>18</sup> for reference to additional Tesoro statements and information regarding these plans still relevant to the 2016 Project. While some details may have changed, Tesoro’s strategy has not, and Tesoro has reiterated these plans. The plans for integrating the two refineries, shutting down the FCCU, and transporting and storing advantaged crudes, especially Bakken and Canadian crudes to the LA refinery complex, expanding pipelines, remain the same.

My 2014 report included Tesoro’s map laying out its plans to transport Bakken crude oil to LA:

G1-81.24  
cont’d.

<sup>15</sup> 7/24/2013 <http://analysisreport.morningstar.com/stock/archive?t=TSO&region=USA&culture=en-US&productcode=MLE&docId=604033> , emphasis added throughout, Attachment 4

<sup>16</sup> Energy Facility Site Evaluation Council, State of Washington, Tesoro Savage Vancouver Energy Project Application No. 2013-01, DEIS, Chapter 1 excerpt: p. 1-1, *[Tesoro Savage Petroleum Terminal LLC (the Applicant) is proposing to construct and operate the Vancouver Energy Distribution Terminal Facility (the Facility, or the Project) at the Port of Vancouver (Port) in Vancouver, Washington, located on the Columbia River. The proposed Facility would be a crude oil terminal capable of receiving an average of 360,000 barrels of crude oil per day by train, storing it onsite, and loading it onto marine vessels.]* <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20Chapters/DEIS%20Ch%201%20Background-PurposeNeed.pdf> Attachment 5

<sup>17</sup> Simmons Energy Conference, *Transformation through Distinctive Performance*, February 27, 2014, <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> Attachment 6

<sup>18</sup> *The Proposed Negative Declaration by SCAQMD for the Tesoro Pipeline from its Long Beach Marine Terminal to New Wilmington Refinery Storage Tanks is Missing Major Expansion Plan Descriptions and Requires a Full EIR, Comments of Julia E. May, Senior Scientist, CBE, June 10, 2014, Attachment 7, also available at:* <http://www.cbecal.org/wp-content/uploads/2014/08/JMay-CBE-Comments-Tesoro-storage-tank-ND-final.pdf>



G1-81.24  
cont'd.

(at p. 9)

Also attached is a separate document I compiled containing many Tesoro quotations about the Project and changes in crude oil (particularly to Bakken) in one place.<sup>19</sup>

**C. Tesoro Savage Vancouver Washington Terminal, recently given a two-year lease extension, is a key part of Tesoro West Coast plans to bring crude to its refineries, from the Bakken region, with options for Canadian crude**

The Tesoro/Savage Vancouver, Washington<sup>20</sup> joint venture *Vancouver Energy Terminal* on the Columbia River is a crude-by-rail to oil tanker terminal. The Vancouver Energy website states:<sup>21</sup>

Tesoro and Savage formed a joint venture to build and operate the Vancouver Energy terminal, which will accept and **ship crude oil that originates in the midcontinent of North America – including the Bakken formation – at the Port of Vancouver USA via rail.** The crude oil will be temporarily and safely stored in secure tanks, then transferred to customers' vessels, **shipped by customers to West Coast oil refineries,** and converted into transportation fuels and other products for U.S. consumption.

G1-81.25

The Draft Environmental Impact Statement (DEIS) for the Tesoro Savage terminal states:<sup>22</sup>

<sup>19</sup> Tesoro Quotations regarding plans to transport Bakken and potentially Canadian crude oil to West Coast and Los Angeles refinery, compiled by Julia May, June 2016, Attachment 8

<sup>20</sup> Not to be confused with Vancouver Canada, which also has oil terminals on the West Coast.

<sup>21</sup> <https://www.vancouverenergyusa.com/>

<sup>22</sup> Available at: <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml> Excerpt as Attachment 9



The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, **and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States.**<sup>2</sup> (at p. ES-2)

... While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, **it is assumed that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility.**

The DEIS also states:<sup>23</sup>

**Starting in 2017, the proposed Facility could receive crude oil from any source with rail access to the Port; however, according to information provided by the Applicant, the most likely sources would be northern mid-continent crude oil produced in North Dakota and Montana, and in Canada.** An average of four unit trains per day would arrive at the proposed Facility.

While Tesoro officials stated in an interview that California permits for the LARIC Project are delayed but expected by the end of this year, the CEO expects the Tesoro Savage Vancouver Energy Project will be ready to go this fall, according to CEO Greg Goff regarding the Vancouver project approval:<sup>24</sup>

"The hearings are formally set for the end of June through about 30 days, so the latter part of July," he said. **"We expect a final Environmental Impact Statement to be issued this fall, followed by a recommendation to the Governor of Washington,"** Goff added.

Despite widespread public opposition to the Project, the lease renewal was granted by the Commission unanimously in April (*Vancouver Port Gives Oil Companies What They Want — More Time*).<sup>25</sup>

(Tesoro also announced purchasing N. Dakota Bakken facilities allowing increased pumping of Bakken crude oil, so the chain of Tesoro acquisitions would extend from N. Dakota, by rail to the Tesoro Savage Terminal in Vancouver Washington, and by ship to the Los Angeles refineries, described later in this report.)

**D. A 2014 expert report on the Tesoro Negative Declaration contains still-valid data and analysis confirming Tesoro's Project as a crude switch with significant impacts**

A report by Dr. Phyllis Fox, 2014 (attached in full<sup>26</sup>), provided extensive analysis that is still valid regarding the nature of Tesoro's storage tank project as part of a larger set of refinery modifications that would facilitate crude oil slate changes.

<sup>23</sup> Tesoro Savage DEIS, Fact Sheet, <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml> Attachment 10

<sup>24</sup> May 6, 2016, S&P Global: Tesoro cuts 2016 spending on project permitting delays, Attachment 11, <https://www.linkedin.com/pulse/sp-global-tesoro-cuts-2016-spending-project-delays-janet-mcgurty>

<sup>25</sup> Oregon Public Broadcasting (OPB), April 15, 2016, <http://www.opb.org/news/article/vancouver-port-oil-terminal-lease-extension/>, Attachment 12

<sup>26</sup> Dr. Phyllis J. Fox, *Comments on the Initial Study and Draft Negative Declaration for the Tesoro Storage Tank Replacement and Modification Project*, June 10, 2014, Attachment 13

G1-81.25  
cont'd.

G1-81.26

The Fox report found for instance that:

- Tesoro’s proposed crude oil tank changes would accommodate a switch to North American crude oils including Bakken crude oil (due to the high tank vapor pressure, which would uniquely accommodate Bakken crude see Fox Report, Volatility of Commonly refined crudes:

*“Bakken crude oils are the only crude oils that I am aware in the market today that have a TVP of 11 psi. . . . This figure shows that all crude oils that are designated as “light” do not have the same vapor pressure and thus, the same environmental impacts when stored and transported. The more volatile the crude, the higher the VOCs, TACs, and greenhouse gas (GHG) emissions, the higher the flammability, and the greater the consequences in the event of an accident. The only “light”<sup>23</sup> crude oil that Tesoro has admitted to refining at its California refineries in its filings with the U.S. Security and Exchange Commission is in Basrah, an imported Iraqi light crude oil with a vapor pressure that is half that of Bakken.”* (pp. 8-9)

- Tesoro’s crude storage tank heaters, could also accommodate Canadian tar sands crude:

*“Further, the two new 300,000-bbl floating roof tanks (3000035/36) will be equipped with heating coils (3/7/13 Revised Application, pdf 42), which would allow handling heavy tar sands crudes.* (pp. 12-13)

- Tesoro made many statements about its plans to bring North American Bakken and/or Canadian crudes to replace Alaska North Slope crude:

*“. . . we acknowledge the substitution or partial shift in our crude slate from ANS [Alaska North Slope] and other lower-value feedstocks to more attractive alternatives, such as Mid-Continent North American advantaged feedstocks.”* (p. 21)

- Tesoro made many statements about plans to use the Vancouver Terminal to bring crudes to its LA refineries:

*“The CEO of Tesoro, Greg Goff, has indicated that the Los Angeles Refinery can take the entire shipment [from the Vancouver Terminal]. There are “no restrictions on how much we can take . . .”* (p. 11)

- Many additional statements of Tesoro, and by the author of the report were included regarding the nature of the Project as a crude oil slate switch.
- Refinery Projects which have already de-bottlenecked the ability to expand processing of high sulfur Canadian Tar Sands crude, by expanding the Wilmington hydrogen plant. Hydrogen is needed for Hydrotreating (which uses hydrogen to strip sulfur contaminants from fuels), and for make-up hydrogen in cracking of heavier hydrocarbon molecules into gasoline-sized molecules), which is required at higher volumes for heavier crude oils (because they have a larger fraction of heavier molecules that must be cracked). That project should also have been considered cumulatively with this Project. (p. 13)

G1-81.26  
cont’d.

**Dr. Fox’s report, my previous comments on the 2014 Negative Declaration, the evidence I provide in this report, and the abundance of evidence Tesoro has published clearly establish that Tesoro’s intention is to change the crude oil slate at the LA refinery,** mainly replacing large volumes of the existing slate with Bakken crude oil, with options to bring in significant volumes of Canadian.

G1-81.26  
cont’d.

The DEIR attached a report (the McGovern Report<sup>27</sup>) which it used as evidence that there will be no crude oil slate change, or perhaps that, if there is a slate change, it is unrelated to the Project. The McGovern Report provides generalized descriptions of refinery operations and crude oil and some particulars about the Tesoro Project, but it does not address many key particulars of the Tesoro Project that will cause significant impacts. It appears the McGovern Report was developed without access to Tesoro’s stated plans specifically to import Bakken crude oil. It also contains some statements that are contradicted by the DEIR or other information. Furthermore, it accepts at face value many conclusory statements provided by the DEIR, without exploration (many statements are prefaced by “it is expected that” or similar statements).

G1-81.27

**The McGovern Report cannot be used by the DEIR to avoid evaluation of impacts of changes in the crude oil slate to the refinery,** because of the following problems:

► **Throughout, it bases its conclusions on generalized ranges, rather than specific baselines.**

For instance, though a range of crudes could be processed at the refinery, the specific crudes in question are not now processed at the refinery in any quantity, but would be after the Project is carried out, causing significant impacts. But the McGovern report states:

As already noted, the sources of crude oil currently received by the Tesoro Los Angeles Refinery constantly change based on a variety of factors and are expected to continue changing regardless of whether or not the LARIC project is implemented. However, the average gravity and sulfur contents of the future crude mix must still fall within Tesoro’s existing feasible operating window. Figures 2-6 and 2-7 in the EIR (attached as Appendix B) show the blended crude API gravity and sulfur contents of the crude oil blends that have been processed in the Carson and Wilmington Operations of the Tesoro Los Angeles Refinery in the three years from 2012 to 2014. p. F-20

G1-81.28

The aforementioned figures from the DEIR only provide a range of crude oils that have been processed. This discussion fails to evaluate a potential change above a specific baseline (as opposed to a generalized range). The fact that the refinery crude oil can come from different parts of the world, and that the specific crudes fluctuate, is irrelevant to the fact that in past years it has had a specific baseline average for different crude oil characteristics. The baseline averages of different crude characteristics can now change considerably as compared to this baseline, and still

<sup>27</sup> DEIR, Appendix F, SJ McGovern Report for South Coast Air Quality Management District, Tesoro Los Angeles Refinery Integration and Compliance Project. Dr. Stephen J McGovern, PE, October 12, 2015

remain within the refinery’s capacity. This is due largely to Tesoro’s plans to provide a new transportation terminal in Washington, and to build an unprecedented volume of storage tanks that can receive this crude, with an extremely high throughput.

G1-81.28  
cont’d.

► **The report expects the public to accept that crude oil data is confidential, even though imported crude oil is public.** Only domestic crude oil is not required to be reported to the US EIA database. In fact, I could replicate a general crude oil slate for the refinery based on public data, described later, which underscores the fact that this is not confidential information, but the details should be provided by the DEIR to perform a proper analysis of the refinery operations and changes.

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It is illogical to claim that somehow because domestic crude is not required to be reported, that it is a different animal than imported crude, or that it’s use is fundamentally different confidential business information. In the case of the Bakken formation, parts of it extend into Canada. It would be nonsensical to claim that data for a company receiving crude oil extracted just North of the border is public, but revealing the same crude oil extracted just South of the border would somehow damage protected business information. In fact, Tesoro itself has publicly discussed the origins of its crude oils in the news media, as described later in this report. What is missing, is the necessary, detailed baseline, that is crucial to the DEIR evaluation.

► **It generalizes that the local “mode of transportation” would not change (ship and pipeline crude oil deliveries), but this is irrelevant.** This point refers to the very local, and general description that the refinery will continue to receive crude oil by ship, through pipelines, to the refinery.

The Tesoro Los Angeles Refinery currently receives crude oil by pipeline and by marine vessel at the Port of Long Beach. The LARIC project will not change the mode of transportation by which the Tesoro Los Angeles Refinery receives crude oil. The LARIC project does not include construction of new facilities to receive crude oil by rail. Tesoro will continue to receive crude oil by pipeline and waterborne cargoes. (At p. F-18)

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However, potential significant impacts can still occur because the Tesoro Savage Vancouver Energy terminal upstream drastically changes Tesoro’s access to Bakken (and some Canadian) crudes. Tesoro has stated it will use this terminal to import large volumes of Bakken crude to its West Coast refineries, and specifically to the LA refinery complex.

► **It fails to identify expansions of units that offset the Wilmington FCCU shutdown:** The McGovern report identified the Wilmington FCC shutdown decrease as part of the reason that it assumed there would be a reduction in capacity for sulfur processing at the refinery:

The hydrocrackers and hydrotreating units are being modified to recover more ultra-low sulfur diesel (ULSD) and accept the lightest portions of the feeds that are currently processed in the Carson and

G1-81.31

Wilmington FCC units. These modifications allow the shutdown of the Wilmington FCC and the elimination of the emissions associated with the operation of the Wilmington FCC. Since the capacities of the cokers are not increasing and the FCC capacity is decreasing, the amount of heavy low gravity crude that the refinery can process will also not increase as a result of the LARIC project. (at p. F-13)

However, this statement did not account for the increase in capacity of the Carson FCCU, and the expanded hydrotreaters (which are expressly for the purpose of removing sulfur contamination). No baseline was provided in the DEIR to demonstrate the sulfur processing capacity in general, nor the baseline of the mentioned Sulfur Recovery Unit (SRU). It is also not just a question of whether the SRU capacity has changed, it is also a question of whether it has slack within its capacity, which could be debottlenecked to operate at a higher level. It appears that Dr. McGovern did not have access to these baselines, as they were not mentioned, and the DEIR did not provide these to the public.

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cont'd.

There are numerous other problems with this report in terms of its failure to cite the basis of its conclusions (rather, it frequently accepts conclusory DEIR expectations, resulting in circular argument), and its failure to make a conclusion based on a specific baseline, rather than a general range. It also fails to recognize the real-world facts, as published by Tesoro, about its actual plans.

This failure of the McGovern Report, and the DEIR, causes a credibility gap. The DEIR should make efforts to actually explore the crude oil baseline, or it will continue to defy believability. The analysis of the DEIR regarding the crude oil switch is deficient based on its failure to recognize available facts, explore available data, evaluate the crude oil slate, evaluate foreseeable changes and the relationship to crude oil changes to the Project, and to take note of Tesoro's own published corporate plans, as well as contradictions to the DEIR's description. Unfortunately, in this aspect, the DEIR reads more like a public relations document provided by Tesoro. It seems determined to avoid evaluation of the crude oil baseline, rather than taking a neutral, scientific, independent approach. This needs to be corrected.

G1-81.32

**III. Tesoro's crude oil slate can be approximated through publicly available data, but the DEIR should provide a detailed baseline, and is off the mark in assuming no Project-related significant crude slate changes**

As described above, the Project actually provides not only for combining two oil refineries, but for changing the crude oil slate. This section evaluates the changes.

**A. Refinery design, choice of crude oil slate, and emissions are interrelated**

**Each oil refinery has common processes and equipment to first separate crude oil components from heavier to lighter**, then to crack heavier molecules into lighter liquids for gasoline, diesel, and jet fuel blending, to remove contaminants such as corrosive sulfur that comes in with the crude oil, and other processing. Equipment includes distillation and fractionation towers, reaction vessels

G1-81.33

using heat, pressure, and catalysts, very large boilers and heaters that burn petroleum fuels and gases to drive the refinery’s high heat needs, coking vessels that produce a coal-like product from the heaviest crude oil fractions, sulfur removal and recovery units, alkylation units to produce higher-octane gasoline components, piping and thousands of valves and flanges, plus pumps, compressors, wastewater processing (since refineries use large amounts of water), cooling towers, storage tanks, product loading equipment, and rail connections. Refineries also use flares to burn “waste” gases, pressure relief devices which vent gases when pressure gets too high. Oil refineries are major emissions sources.

**Each is also customized to refine a chosen crude oil “slate” (the particular crude mix), and it is a business choice to obtain the least expensive inputs to transport, store, and refine, to make the most profitable outputs (like gasoline).** The crude mix, in combination with the refinery design and operations, results in the particular volumes of gasoline, diesel, jet fuel, petroleum coke, propane, and other products sold. The design, operation and crude slate choices will determine the fractions of gasoline, diesel, jet fuel, petroleum coke, propane, butane, etc., produced. **The company makes a decision about what crude oils to purchase within the range of the refinery design, and all these choices impact emissions and safety.**

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- If a refinery uses light and low sulfur crude oil (called “sweet” crude), it does not have to remove as much corrosive and hazardous sulfur from the crude oil, and it can produce more light, profitable products such as gasoline and less heavy, cheap products such as petroleum coke (similar to coal). But light sweet crude oils have historically been expensive.
- If a refinery uses heavy, high sulfur crude oil, these are generally cheaper, but the refiner must have larger capacity in sulfur-removing equipment (such as hydrotreaters or desulfurization units), and a large capacity to crack heavy crude oil fractions into lighter liquid molecules for gasoline blending.
- In Tesoro’s case it has historically refined heavier, higher sulfur crude oil in the Wilmington refinery, and less heavy, less sulfurous crude in the Carson refinery (formerly BP).
- **The crude slate was not, and should have been provided in the DEIR.**

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It is established in oil industry literature that changes in crude oil slate affect refinery design, operations, and products, as acknowledged by the DEIR.<sup>28</sup>

**B. Tesoro’s crude slate baseline can be pieced together based on publicly available data**

**Although data on the crude slate “baseline” (a measure of the past) should have been provided in detail in the DEIR in order to identify the change from this baseline, the public can piece together a picture of Tesoro’s crude oil slate, and changes due to the Project.** In addition to the relationship to the proposed refinery equipment and operations changes, and associated environmental impacts. We can illustrate this through the information below step by step, and the associated impacts become very apparent, but the DEIR should be rewritten to include the full details, baselines, and changes relating to the crude oil slate.

G1-81.35

<sup>28</sup> For example, DEIR at pp. 2-14 to 2-18

**The public has online access to the U.S. Energy Information Administration (EIA) data on imported crude oil from foreign countries used in each oil refinery**, with monthly data on the country of origin of the crude, the number of barrels, the sulfur percent, the API gravity, the Port City, and a few other pieces of information. However, the EIA data does not include *domestic sources* of crude oil used by each refinery. It cannot be claimed that somehow crude oil which comes from foreign sources is proprietary, but domestic crude oil use is confidential, and in fact there is general information available about domestic crude oil as well which is published by oil refiners including Tesoro, but it is not available in such an organized way

Oil refiners are required to report data to the US Energy Information Administration (EIA) on crude oil imported into the U.S. I downloaded US EIA 2015 monthly crude oil import data, excerpted Tesoro LA (Carson and Wilmington), which provides country of origin, sulfur content, API gravity, and is reported in thousand barrels each month. I totaled deliveries from each country, and converted to average barrels per day over the year. This data is attached to this report, with my calculations of weighted averages added.<sup>29</sup> The data does not include domestic crude oil use at the refineries, which is not required to be reported the US EIA.

The data shows that in the last year Canadian crude oil was not imported to either the Tesoro Carson or Wilmington refineries, although in previous years, small amounts of Canadian was imported.<sup>30</sup> Imports were from Argentina, Angola, Australia, Belgium, Brazil, Columbia, Ecuador, Equatorial Guinea, India, Iraq, Kuwait, Peru, Russia, Saudi Arabia. It is unknown from this data how much crude oil came from different geographic areas within the U.S., or the quality of this U.S. crude oil (such as percent sulfur, or API gravity). Most of the imports reported for the Tesoro Los Angeles refineries came to the Carson refinery – Wilmington showed almost no imports.

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<sup>29</sup> Tesoro Los Angeles Refinery Monthly Crude Oil Imports in 2015, downloaded by J. May, CBE, 4/15/2016 from the U.S. Energy Information Administration (EIA) monthly petroleum imports by facility, available at:

<http://www.eia.gov/petroleum/imports/companylevel/>, and also Attachment 14: Tesoro 2015 Crude Oil Imports

<sup>30</sup> My previously cited Tesoro 2014 Negative Declaration comments, p. 19, showed 245 thousand barrels of Canadian crude oil were imported by Tesoro to the Wilmington refinery, for example, in March of 2014. Also as a correction to the label on the table, which identified the units as thousands of “bpd” (barrels per day), this should have been labeled thousands of barrels. The EIA data provides the numbers in units of thousands of barrels delivered in a particular month.

Table 1: Tesoro Carson crude imports downloaded from US EIA 2015 data & aggregated<sup>31</sup>

2015 imports	Volume (average barrels/day, converted from thousand barrels delivered during one month)	Percent of imported	Weighted Average Sulfur %	Weighted Average API Gravity
Angola	37,403	23.4%	0.43 (Sweet)	29.4 (Moderate)
Iraq	36,367	22.8%	3.16 (Sour)	28.2 (Moderate)
Saudi Arabia	32,066	20.1%	2.00 (Sour)	33.1 (Light)
Brazil	21,493	13.4%	0.36 (Sweet)	30.6 (Light)
Ecuador	17,211	10.8%	1.54 (Sour)	23.0 (Moderate)
Columbia, Equatorial Guinea, Russia, Kuwait, Australia, & Peru	15,304	9.6%	0.32 to 2.62% (Sweet to Sour)	19.4-35.1 (Heavy to Light)
	Total barrels imported		Overall Weighted Average S%	Overall Weighted Average API
	<b>159,844</b>	100%	<b>1.49</b> (Sour)	<b>29.41</b> (Moderate)

- The 2015 data above shows the Carson refinery imported almost 160,000 barrels of crude oil, with weighted average sulfur content at about 1.5%, weighted average API 29 degrees.
- Carson has capacity to process in the range of another 100,000 bbls/day of crude oil, so the 160,000 barrels of foreign imports represents about 60% of the Carson total.
- Tesoro identified which domestic crudes are used in the LA Refinery (Carson and Wilmington together): *“The refinery processes heavy crude from California’s San Joaquin Valley and Los Angeles Basin as well as crudes from the Alaska North Slope, South America, West Africa and other international sources.”*<sup>32</sup> Tesoro’s SEC report also stated:<sup>33</sup> *“Our California refineries run a significant amount of South American heavy crude oil (“Oriente”), San Joaquin Valley Heavy (“SJVH”) and light crude oil from Iraq (“Basrah”), which continued to be priced at a discount to Brent throughout 2013.”*
- Carson’s domestic crude input portion has historically been Alaska North Slope (ANS).<sup>34</sup>
- That leaves Wilmington with the California San Joaquin & LA Basin crude, since almost no foreign crude oil use was reported for Wilmington in 2015 to the EIA, so most had to be domestic (which the EIA does not report).

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<sup>31</sup> I downloaded monthly reports from the U.S. Energy Information Administration (EIA), available at <http://www.eia.gov/petroleum/imports/comparylevel/>, for each month in 2015, filtered Tesoro Carson and Wilmington reports, totaled for each country, and calculated weighted average sulfur % & API gravity, Attachments 15 and 16

<sup>32</sup> Los Angeles Refinery Fact Sheet, Tesoro, available at: <https://tsocorpsite.files.wordpress.com/2016/04/tesoro-los-angeles-fact-sheet.pdf> Attachment 17

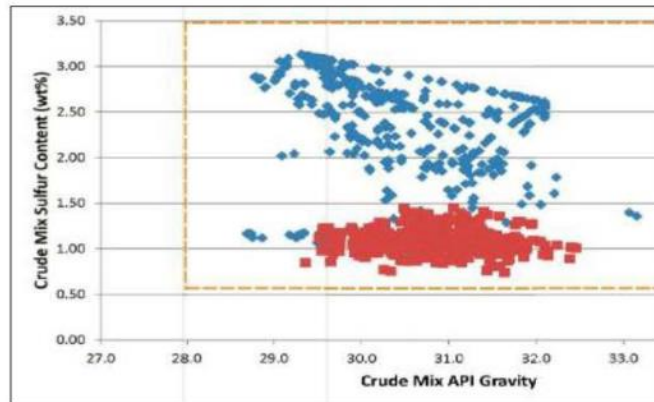
<sup>33</sup> <http://www.sec.gov/Archives/edgar/data/50104/00005010415000030/ex99112-31x2014tso10xkrecr.htm> at p. 32, excerpt 2014, Attachment 18

<sup>34</sup> *BP agrees to sell Carson refinery and ARCO retail network in US southwest to Tesoro for \$2.5 billion*, BP Website, 12 August 2012, [“The refinery is located on 650 acres in Los Angeles County, near the Long Beach and Los Angeles Harbours. . It processes crude oil from Alaska’s North Slope, the Middle East, West Africa and other sources. Processing equipment include the largest fluid catalytic cracker in California, two cokers and distillate hydrocracking.”] - <http://www.bp.com/en/global/corporate/press/press-releases/bp-agrees-to-sell-carson-refinery-and-arco-retail-network-in-us-southwest-to-tesoro-for-25-billion.html> Attachment 19

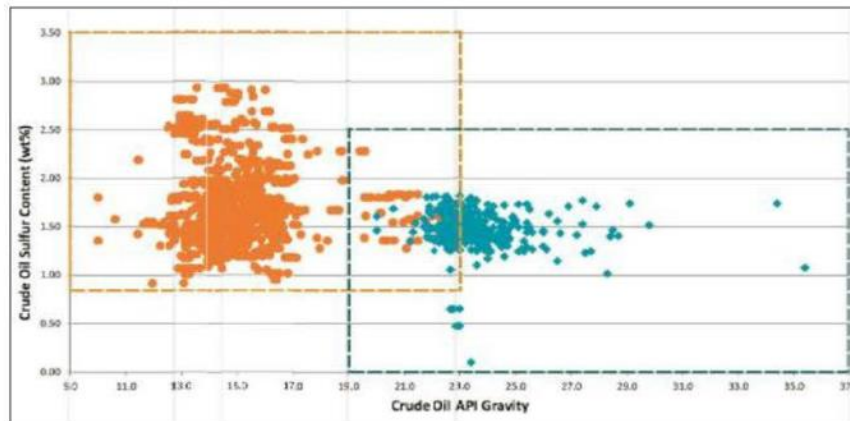


The DEIR did provide some information on crude oil at the two refineries. For example, the following graphics show sulfur % and API gravity spreads at the refineries (each point represents a different crude oil).

DEIR Figure 2-7 below -- Carson



DEIR Figure 2-6 below -- Wilmington



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Table 2: Predominant Crude Oil sulfur and API gravity range in DEIR figures 2-6 and 2-7

DEIR Figure 2-7 above shows for Carson	DEIR Figure 2-6 above shows for Wilmington
Crude Units 1&4 (lower cluster): Mainly ~0.8-1.4% sulfur, Crude Unit 2 (upper scatter): Mainly about 1.8-3% sulfur	Crude Unit (in right box cluster) Mainly about 1.3-1.7% sulfur
All three Carson Crude Units show API gravity mainly about 29-32° API	Mainly about 21-25° API
The DEIR describes <i>the whole range</i> for the refinery Sulfur & API range <i>capability</i> , including the tail ends outside the main clusters, and not the historical <i>baseline</i>	
API gravity range of 28-35° 0.6-3.5 weight % sulfur	19-37° API 0.0-2.5 weight % sulfur

Summarizing the import crude oil US EIA data presented in Table 1, and pulling together additional available information from company statements on domestic crude use for Tesoro Carson (sulfur and API gravity), and the same for Tesoro Wilmington (which has almost no imports, so almost entirely domestic), we can also approximate the overall sulfur and API for the overall Tesoro LA refinery complex. This is within the range of sulfur % and API provided by the DEIR. It also shows that the crude oil sulfur % for the overall refinery can go up or down substantially and still operate within the range of the refinery’s capability given by the DEIR. API gravity can also go up or down substantially and still operate within the range of the refinery’s capability. The DEIR focuses on the refinery’s capability within certain limits, but it does not establish a baseline.

**Table 3. Summary of available data to estimate crude oil sulfur and API gravity at the Tesoro Carson & Wilmington Refineries (the Los Angeles Refinery complex)**

	Average Barrels per day	Crude Oil	Sulfur	API
Carson Imported Crude	159,844	Mainly from Angola, Iraq, Saudi Arabia, Brazil, Ecuador (Imported Carson crude from EIA 2015 data - see Table 1)	1.49	29.41
Carson Domestic Crude	97,456 <sup>35</sup>	Alaska North Slope (ANS) reported by BP Carson	0.9 <sup>36</sup>	32.1 <sup>37</sup>
Wilmington Domestic	104,500	Reported by Tesoro as California San Joaquin & LA Basin, with approximate Sulfur % & API from DEIR Fig. 2-6	1.5 <sup>38</sup>	23 <sup>39</sup>
Total LA complex <sup>40</sup>	363,000	Overall refinery weighted average sulfur and API gravity estimation based on above:	<b>1.33</b>	<b>28.19</b>

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cont’d.

**This information should be supplied in the DEIR in detail, providing a more specific baseline for the both the Carson and Wilmington refinery**, including the last 5 years’ domestic and imported crudes, volumes, geographic origin, transportation method, sulfur content, API gravity, TAN, metal content, other important data such as benzene content, special handling issues due to volatility or waxiness, etc. The DEIR should evaluate impacts of the planned and foreseeable changes in the crude slate as part of the overall Project. Instead the DEIR statements are misleading and conclusory in determining that crude oil slate changes are unrelated to the Project. Tesoro itself has provided overwhelming statements to the contrary in investor statements. Instead of a

<sup>35</sup> Total Carson bbls/day from US EIA Jan 1, 2015 Carson total of 257,300<sup>35</sup> so domestic = total minus imported  
<sup>36</sup> The North American Crude Boom: How Changing Quality Will Impact Refiners, John R. Auers, Turner, Mason & Company, Platts Crude Marketing Conference, March 1, 2013, Houston, Slide 28, Attachment 20 [file:///C:/Users/Julia%20May/Desktop/jan12%20to%20Apr16%20NEW/refineries%20Tesoro/Tesoro%20BP%202016%20integration%20DEIR/background%20info/North\\_American\\_Crude\\_Boom-platt-2013.pdf](file:///C:/Users/Julia%20May/Desktop/jan12%20to%20Apr16%20NEW/refineries%20Tesoro/Tesoro%20BP%202016%20integration%20DEIR/background%20info/North_American_Crude_Boom-platt-2013.pdf)  
<sup>37</sup> *Id.*  
<sup>38</sup> Using DEIR Figure 2-6 which shows Wilmington distillation unit mainly in the range from 1.3 to 1.7% sulfur  
<sup>39</sup> Again using DEIR Figure 2-6 which shows Wilmington distillation unit mainly in the range from 21 -25° API  
<sup>40</sup> Using DEIR total number refinery capacity of 363,000 bbls/day (although this is slightly larger than the US EIA total given), DEIR at p. 2-17

baseline the DEIR provided a range of sulfur and API gravity. The public can endeavor to dig up the data above, but the DEIR should provide the specific data.

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**C. Tesoro’s business plan emphasizes Bakken crude, but also has ready options for blending Canadian and Bakken to approximate Alaska North Slope yields**

Crude oil blending can be used to achieve needed characteristics: *“By blending lower-grade crude oil with higher grade crude oil or natural gas to reach, but not exceed, target specifications, the price valuation of crudes can be increased significantly. Profits are earned if target specifications are reached by blending the minimum amount of high-grade crude oil with low-cost hydrocarbons.”*

An oil industry presentation, *The North American Crude Boom: How Changing Quality Will Impact Refiners*,<sup>41</sup> specifically identified a blend of cost-advantaged Bakken and Canadian crude oils as a replacement for Alaska North Slope crude oil (*“Profitable opportunities for light/heavy crude blending have developed”*) using Bakken and Canadian crudes (WCS or Western Canadian Select<sup>42</sup>) to approximate Alaska North Slope (ANS) crude oil.

Market Prices, \$/B	2011	2012	Jan 2013
ANS (Long Beach)	110.01	111.15	109.98
Bakken (Clearbrook)	98.26	88.90	91.23
WCS(Hardisty)	79.25	72.25	59.19
Estimated Blending Profitability*	\$12 to \$15/B	\$21 to \$25/B	\$25 to \$29/B

\*Assuming unit train rail transportation for Bakken and TM P/L transportation for WCS and allowing for estimated quality differential between WCS/Bakken blend and ANS.

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<sup>41</sup> *The North American Crude Boom: How Changing Quality Will Impact Refiners*, John R. Auers, Turner, Mason & Company, Platts Crude Marketing Conference, March 1, 2013, Houston, [file:///C:/Users/Julia%20May/Desktop/jan12%20to%20Apr16%20NEW/refineries%20Tesoro/Tesoro%20BP%202016%20integration%20DEIR/background%20info/North American Crude Boom-platt-2013.pdf](file:///C:/Users/Julia%20May/Desktop/jan12%20to%20Apr16%20NEW/refineries%20Tesoro/Tesoro%20BP%202016%20integration%20DEIR/background%20info/North%20American%20Crude%20Boom-platt-2013.pdf)

<sup>42</sup> WCS or Western Canadian Select has 3-3.5% Sulfur, 20.5 to 21.5° API density Oil Sands Magazine, Western Canadian Select Explained, Feb. 18, 2016, <http://www.oilsandsmagazine.com/western-canada-select-wcs-crude-oil-definition/>

ANS Blending Opportunity

	WCS/Bakken	ANS	Delta
Bakken, %	55%		
WCS, %	45%		
API Gravity	32.1	32.1	0.0
Sulfur, wt%	1.4	0.9	+0.5
TAN, mg/KOH	0.6	0.1	+0.5
<b>LV% Yields</b>			
C4-	3%	4%	-1%
Naphtha	26%	26%	
Kero/Diesel (665 EP)	27%	27%	
Gas Oil (1050 EP)	28%	27%	+1%
Resid (1050+)	16%	16%	

Using such a blend at Tesoro would replace dwindling supplies of lighter, low sulfur Alaska North Slope crude oil used in the range of 100,000 barrels per day (bpd). (The DEIR should provide specific information on actual amounts of domestic crude oils used at the refinery, and all crude characteristics.)

The replacement mix for this amount of ANS crude, using the recommended 55% Bakken and 45% WCS (Western Canada Select) as proposed by Turner, Mason, & Company above, would mean 55,000 bpd of Bakken, and 45,000 bpd of WCS. This would result in yields of C4 hydrocarbons, naphtha, kerosene/diesel fractions, gas oil, and resid<sup>43</sup> that are very similar to the yields produced by Alaska North Slope crude (as listed in the table). API gravity would be the same, sulfur content and TAN (Total Acid Number) would be up 0.5%. This switch is clearly feasible, but there would be significant impacts of this switch. **Tesoro could furthermore replace portions of the California heavy crudes with cheap Canadian crudes as well.**

While the DEIR claims that Tesoro is not doing this, it proposes no permit conditions that would prevent this switch, and it fails to evaluate the environmental impacts that would occur due to this switch.

These examples illustrate that contrary to the DEIR, Tesoro can use this Project to switch its crude oil stock to cheaper North American Bakken and Canadian Tar Sands Crude Oil, by providing tank expansions to accommodate the new crudes, while connecting transport routes through the Tesoro Savage terminal (projected to start in 2017), and also through addition of extensive sulfur contamination removal equipment (hydrodesulfurization and hydrotreaters, discussed below) that can remove higher sulfur content from Canadian crude. The DEIR identifies additional benefits of these activities (such as reducing ship port time), but that does not prevent the project impacts that would occur due to the crude oil switch.

<sup>43</sup> Residual oil

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cont'd.

The DEIR instead described limitations of the refinery that it concluded would prevent such crude oil slate changes, but it failed to evaluate crude mixes that would leave the refinery operating within its design parameters for crude API gravity range. For example, the Bakken /WCS blend would approximate the current ANS API. This would avoid the problems the DEIR identified (such as flooding in the Distillation unit if too much light crude was present for the unit design<sup>44</sup>) or overwhelming the coking units if too heavy a mix was identified, but it would still introduce new impacts.

So even if matching ANS exactly in gravity, the switch would still introduce new impacts not evaluated in the DEIR, due to other crude oil characteristics. For example, explosion hazards would increase from Bakken crude introduction, additional content of toxics such as benzene that werenot investigated in the DEIR discussion would be introduced, and increased introduction of waxy residue which can cause processing difficulties requiring more maintenance. Further, increased sulfur mass from Canadian crudes would increase corrosion hazards and increase acutely hazardous sulfur gases (for example hydrogen sulfide).

There are other Canadian tar sands crudes that can be blended this way – the DEIR should provide an evaluation of the Canadian crudes which have been used at the refinery, and which could be used (unless permit conditions are set prohibiting the use of Canadian tar sands crude oils).

The switch to Bakken and potentially Canadian Crude has major impacts (later described) that must be analyzed, unless permit conditions are set to preclude use of these crudes.

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**D. Many Project elements involve expanded sulfur contamination removal**

Tesoro is adding a significant amount of sulfur contamination removal equipment as part of the Project. Sulfur contamination comes into the refinery with the crude oil. Higher sulfur crude oil (called “sour” crude) contains more sulfur than low sulfur crude (called “sweet” crude). Sulfur contamination must be removed for multiple reasons. Sulfur compounds are corrosive attack refinery equipment, and can cause thinning of metals until they fail,<sup>45</sup> as in the case of the Chevron Richmond 2012 explosion, where the U.S. Chemical Safety Board found that such sulfidation corrosion and metal thinning had been repeatedly identified by Chevron workers and inspectors, but

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<sup>44</sup> See DEIR at p. 2-16

<sup>45</sup> [**“Sulfur Compounds.** Sulfur may be present in crude oil as hydrogen sulfide (H<sub>2</sub>S), as compounds (e.g. mercaptans, sulfides, disulfides, thiophenes, etc.) or as elemental sulfur. Each crude oil has different amounts and types of sulfur compounds, but as a rule the proportion, stability, and complexity of the compounds are greater in heavier crude-oil fractions. Hydrogen sulfide is a primary contributor to corrosion in refinery processing units. Other corrosive substances are elemental sulfur and mercaptans. Moreover, the corrosive sulfur compounds have an obnoxious odor. Pyrophoric iron sulfide results from the corrosive action of sulfur compounds on the iron and steel used in refinery process equipment, piping, and tanks. The combustion of petroleum products containing sulfur compounds produces undesirables such as sulfuric acid and sulfur dioxide. Catalytic hydrotreating processes such as hydrodesulfurization remove sulfur compounds from refinery product streams.”] emphasis added, available at: [https://www.osha.gov/dts/osta/otm/otm\\_iv/otm\\_iv\\_2.html](https://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_2.html)

left unrepaired, causing a major fire and burning of the refinery distillation unit.<sup>46</sup> Sulfur compounds can also poison catalysts used for cracking longer chain crude oil components in the refinery, so that catalysts do not perform their function properly. Sulfur compounds must also be limited in the end products coming out of the refinery (gasoline, diesel, and jet fuel). California has long had low-sulfur requirements for fuels necessitating such sulfur removal equipment (see more in the next section). The DEIR also explains the need to remove sulfur (and nitrogen):<sup>47</sup>

To meet product specifications, impurities in the crude oil, such as sulfur and nitrogen compounds and metals, must be removed. **Hydrotreating units remove sulfur and nitrogen from process streams; sulfur in the form of hydrogen sulfide, and nitrogen in the form of ammonia, which are then converted into elemental sulfur and nitrogen in sulfur recovery units.** Nitrogen, an inert gas, is emitted from the sulfur recovery unit.

While the Tesoro Wilmington and Carson refineries have extensive sulfur removal equipment (such as hydrotreaters), the Project includes the following expanded process units for this purpose, as compiled in the table below, based on the DEIR and Proposed Title V Permit for the Project:

**Table 4: Project Modifications that Add Capacity to Remove Sulfur Contaminants<sup>48</sup>**

Light Hydrotreating Unit modification A/N 567645	“The Light Hydrotreating Unit will be modified to more effectively remove sulfur from FCCU gasoline, for compliance with federally mandated Tier 3 gasoline sulfur specifications. <b>The modified Light Hydrotreating Unit will process a higher sulfur feed material derived from existing fractionation equipment.</b> ”
Naphtha Hydrodesulfurization Unit modification A/N 567646	“The Naphtha Hydrodesulfurization Unit will be modified by the installation of new equipment <b>to allow removal of contaminants from unit feed and sulfur from pentanes.</b> ”
Mid Barrel Distillate Treater modification A/N 578248	“The Mid Barrel Unit will be modified to <b>enable it to desulfurize heavy FCCU naphtha.</b> Interconnecting piping to/from the Light Hydrotreating Unit and Mid Barrel Distillate Treater will be installed.”
New Wet Jet Treater (future permitting) A/N 567619	“A new 50,000 BPD Wet Jet Treater will be installed <b>to remove mercaptans</b> and to reduce the Total Acid Number (TAN) of jet fuel.” (Mercaptans are sulfur compounds.)

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The DEIR and Draft Title V permit documents frequently emphasize the purpose of the additional desulfurization equipment as a compliance project to meet federal “Tier 3” low sulfur fuels Tesoro does sell some fuels out of state, which will be required to meet the new federal low sulfur fuels standards next year, but this is a small fraction of total Tesoro sales, so the large increase in

<sup>46</sup> U.S. Chemical Safety Board, Final Investigation Report, Report No. 2012-03-I-CA, Chevron Richmond Refinery Pipe Rupture and Fire, January 2015, available at <http://www.csb.gov/chevron-refinery-fire/>, for example at p. 5.

<sup>47</sup> DEIR at p. 2-12

<sup>48</sup> Draft Title V Permit, pp. 26-27 AQMD engineering evaluation (111<sup>th</sup> to 112<sup>th</sup> pages of the pdf).

desulfurization equipment appears out of proportion with what is needed to comply with federal Tier 3 standards. Tesoro confirmed that out-of-state fuels sales from the LA refinery (to Nevada and Arizona) is a small fraction compared to in-state sales (which already meet California’s low-sulfur fuels standards), during a meeting with CBE.<sup>49</sup> The DEIR should identify baselines – the fraction of out-of-state fuels sales compared to in-state sales – and the proportion of added sulfur removal equipment that is for federal compliance and the portion that is not.

Tesoro is also reconfiguring the refinery to shut down the Wilmington FCCU while expanding the Carson FCCU and Carson Hydrocracker processing, and at the same time adding flexibility to switch from gasoline to distillate production. These changes are also being done in concert with some reconfiguring of the sulfur removal processing.

However, the total sulfur removal processing in the refinery should not change drastically unless Tesoro brings in significantly more high-sulfur crude oil. Tesoro does have an opportunity to bring very high sulfur crude oil from Canadian Tar Sands to the LA refinery when the Tesoro Savage Vancouver terminal becomes operational (projected for this fall). While the refinery can already process some higher sulfur crude oil, the average sulfur percent is not close to the extremely high sulfur content of Canadian tar sands crude oil. While most of the crude delivered to the Tesoro Savage Terminal would be lower sulfur Bakken crude, significant volumes of tar sands crude will also be available to Tesoro LA through Tesoro Savage Vancouver.

For all the above reasons, the DEIR needs to provide a baseline of the existing sulfur recovery capacity, and the overall increase in sulfur removal capacity that the Project will provide. This not only has implications for the specific crude oils brought to the refinery, it also means a large increase in the processing of acutely hazardous hydrogen sulfide and other hazardous sulfur compounds in the refinery. It should not be assumed that Tesoro’s added desulfurization equipment is only for compliance purposes.

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cont’d.

**E. Tank expansion is extraordinary, adding 3.4 million barrels’ volume of crude oil storage, and allowing about 420,000 barrels/day of increased throughput, with additional impacts not explored in the DEIR**

Storage tanks are essential for terminal, transportation, and refining operations, as Tesoro has stated.<sup>50</sup> But contrary to the DEIR, the extraordinary tank expansions are not solely for faster ship offloading. They include not only 3.4 million bbls of new storage, but also increased *throughput* through new tanks greater than 153 million bbl/year (or 419,000 bbls/day average), when only including the six largest new tanks. Throughput is a measurement of how fast the material through the tanks is turned over (or emptied and replaced). It is a measure of volume moved per unit of time (such as barrels moved per day or per year in this case). By comparison, the existing Tesoro LA

G1-81.39

<sup>49</sup> 6/1/2016 meeting of CBE and Tesoro by telephone and webex presentation of Tesoro LARIC project.

<sup>50</sup> “Terminaling, Transportation, and Storage” will “Consolidate Tesoro volumes in Southern California distribution system” Tesoro presentation, Jan 2014 Deutsche Bank Energy Conference, January 9, 2014, (Slide 24), Attachment 21

refinery complex can process crude oil of at least 363,000 bbls/day, and in addition already has storage to accommodate its current daily crude throughput needs, so the new tanks would add new throughput capability greater than the entire existing refinery currently processes.

**Where would an entire refinery’s worth of new crude oil throughput go? It does not simply sit in new tanks.** The DEIR should provide a detailed analysis, including exports to Tesoro facilities (e.g. Tesoro Logistics), to third parties, and others. Yet the DEIR states: *“There is no change proposed to crude oil throughput at the Carson Operations”* and *“As discussed in Chapter 2, no changes to the Crude Units are being made that would affect the crude oil throughput of the Wilmington Operations.”*<sup>51</sup> These conclusory statements fail to account for the throughput increases in the large tanks that were modeled as allowable in the DEIR and cited below. For clarity - the throughput for the whole refinery is the actual refining of the crude oil, first through separation in the distillation units, then cracking, etc., downstream, until it is made into products such as gasoline, diesel, etc. This is a separate issue from the tank’s crude oil throughput – which is the simple loading of crude into and then draining crude from the new storage tanks. But the DEIR still does not explain the ultimate fate of the large flow of crude oil through these new tanks.

This is important because the downstream end use of this crude will have significant impacts, whether it is sold to other refineries in the region, or exported out of the country, or used as a throughput increase in the Tesoro LA refinery. If instead the crude just sits in the tank and does not get used quickly, then the throughput identified in the EPA TANKS model would not be as high as it is modeled. The DEIR does not identify whether the EPA TANKS turnover rate would also be used as permit limits when a permit is developed. The AQMD does not yet have a published draft permit for this part of the Project, so we do not know whether the throughput (turnover rate) could go even higher. Further, the DEIR does not provide the throughput for the *sting* crude oil storage tanks, which already have the ability to supply the refinery.

The DEIR also does not provide the total volume for the existing crude oil storage at the Carson refinery (just the Wilmington side, at about 1.7 million bbls).<sup>52</sup> CBE asked Tesoro representatives to provide this information. Tesoro representatives responded that the Carson portion of the refinery has an existing capacity of 2.25 million barrels (for tanks receiving crude from ships).<sup>53</sup> (This does not fully answer whether there are additional crude oil storage tanks *not* received by ship, which should also be disclosed by the DEIR.) Thus, according to the DEIR and numbers provided by Tesoro, the total crude storage capacity is about 4 million bbls for the Wilmington and Carson refineries, and would increase to about 7.4 million bbls (about 85% increase):

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cont’d.

<sup>51</sup> DEIR at pp. 4-26 & 4-28

<sup>52</sup> DEIR at p 2-23, [*“The Wilmington Operations currently utilize 20 storage tanks to store crude oil and other heavy petroleum liquids (18 have a capacity of 80,000 bbl and two have a capacity of 125,000 bbl).”*]

18 x 80,000 + 2 x 125,000 = 1,690,000 bbls (about 1.7 million bbls)

<sup>53</sup> 6/1/2016 meeting of CBE and Tesoro by telephone and webex presentation of Tesoro LARIC project.



Table 5: Proposed Storage Tank Expansions are Extensive<sup>54</sup>

Tank ID	Permit Capacity (Bbls)	New Throughput Capacity from DEIR	Service
	<b>NEW</b>	153 million bbls/yr = ~419,000 bbls/day	
CCT#1(C)	500,000	Each tank was modeled in DEIR at 25.5 million bbls/yr crude throughput, totaling 153 million bbls/yr added throughput for all 6. <sup>55</sup>	Crude Oil
CCT#2(C)	500,000		Crude Oil
CCT#3(C)	500,000		Crude Oil
CCT#4(C)	500,000		Crude Oil
CCT#5(C)	500,000		Crude Oil
CCT#6(C)	500,000		Crude Oil
	<b>REPLACED</b>	Unknown total	
300035(W)	300,000 new	Each 300,000 bbl tank modeled at 18,000,000 bbls/year throughput. <sup>56</sup>	Crude Oil
300036(W)	300,000 new		Crude Oil
80035(W)	80,000* removed	Throughput on these smaller tanks would go away; DEIR does not provide turnover rate.	Crude Oil
80036(W)	80,000* removed		Crude Oil
	<b>MODIFIED</b>	Unknown total	
80038(W)	80,000	Increase throughput, add Vapor Recovery	Petroleum Distillates, adds Light Gas Oils
80060(W)	76,300	Increase throughput, convert to Intern. Float.	Crude Oil
80067(W)	75,000	"	Crude Oil
80079(W)	80,000	Increase throughput	Crude Oil
14(C)	360,000	Increased utilization – App B-3, p B-3-8	Gas Oil
31(C)	78,700	"	Naphtha
62(C)	100,060	"	Naphtha
63(C)	100,060	"	Naphtha
64(C)	100,060	"	Alkylate
502(C) Heated	1,500,000	"	Gas Oil
959(C)	164,000	"	Gas Oil
80044 (W)	79,847	"	Gasoline
80074 (W)		"	Out of Service, to Diesel
80211 (W)		"	Naphtha
80215 (W)		"	Naphtha
80217 (W)		"	Naphtha

G1-81.39  
cont'd.

<sup>54</sup> Information from DEIR Append B-3, Tables 1 & 2

<sup>55</sup> From DEIR App B-3, p. B-3-121, TANKS modeling inputs (21,000,000 gal tank, divided by 42 gals/bbl = 500,000 bbls). Turnovers listed at 51.0 (annual): 51 x 500,000 bbls = 25.5 million bbls/year throughput for each.

<sup>56</sup> As above, 60 turnovers per year gives 300,000 x 60 = 18,000,000 bbls/year throughput each new tank. (As above, from App B-3, p. B-3-182)

Of note in the table above is:

- **The sheer volume of capacity and throughput** – 8 new tanks, 16 with increased “utilization” and a major increase in throughput (over 153 million bbls/year increased throughput just from the 6 largest new tanks), with a volume increase of 3.4 million bbls.
- **This overall throughput increase means Tesoro will not only be allowed to offload faster from ships simply for storage, but also to send crude oil out of these storage tanks faster**, to use or to sell, since the product must go somewhere if removed from the tanks. (The same would be true for materials other than crude oil stored in the Project tanks).
- **This volume and throughput increase opens up a large amount of flexibility for other refinery tanks**, so all the refinery tanks should be considered a part of the Project.
- **These permitted implications were not evaluated in the DEIR.**

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cont’d.

G1-81.40

**The DEIR should provide evaluation regarding how these new and expanded tanks allow the accommodation of new crude oils including Bakken, Canadian Tar Sands, and others.** For Bakken crudes this would include but not be limited to higher tank vapor pressure limits, special handling and solvent additions for waxy deposits, and adding controls for higher volatility, including higher benzene<sup>57</sup> and other toxics. For heavy crudes such as Canadian tar sands this would include accommodations such as additional heating, and additional mixing, as well as added solvents.

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The original 2014 Negative Declaration (ND) did identify a high vapor pressure limit for the two replaced tanks. High vapor pressure indicates Bakken crude accommodation. These same tanks are part of the 2016 project (300035 and 300036) listed with the same new characteristics, but the ND also provided the vapor pressure information (True Vapor Pressure (TVP) at 11 psi (lbs/square inch)),<sup>58</sup> consistent with Bakken crude oil. The DEIR should identify the vapor pressure of this and other Project tanks.

**The DEIR should have included a baseline identification of the specific crude oils that currently are, and can be, stored in existing tankage, including baselines for specific crude oils** (geographic origin, API, sulfur %, benzene %, volume, metal content, TAN, etc.), and the potential for changes in crude oil given the new tanks.

G1-81.42

<sup>57</sup> Dr. Phyllis J. Fox, July 1, 2013, *Comments on Initial Study/Mitigated Negative Declaration (IS/MND) for the Valero Crude by Rail Project Benicia, California Use Permit Application*, [“The pollutants in the diluent blended with these DilBit crudes and in the light sweet shale crudes include significant amounts of hazardous air pollutants, such as benzene, a potent carcinogen.”] at p. 1, with additional methodology thought, for evaluating the benzene content of Bakken crude, Canadian crude diluents, and other crude oils, available at: [http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report\\_by\\_Dr.\\_Phyllis\\_Fox.pdf](http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report_by_Dr._Phyllis_Fox.pdf)

<sup>58</sup> 2014 ND at p. 1-13

The Project has the potential for significant additional air emissions from tanks

The DEIR Appendix B, Operational Emissions Calculations, identified significant emissions increases from these tanks due to the Project, even with additional controls added (such as vapor recovery or converting to floating roof tank), for example at p. B-3-45.

However, the DEIR did not discuss tank emissions to the air from tank cleaning and degassing (nor from pipeline cleaning and degassing), which need specific evaluation, especially due to the large increase in volume and throughput. The AQMD found in its Rule 1149 Final Environmental Assessment: for Storage Tank and Pipeline Cleaning and Degassing, that generalized estimations of air emissions due to these activities underestimated emissions, and wrote new requirements. However, the regulation did not cut emissions to zero, it aimed to reduce them.<sup>59</sup> The DEIR should add an evaluation of remaining emissions from tank cleaning and degassing.

The Environmental Assessment concluded that there is a wide variation in emissions from these activities at individual tanks, dependent on specific conditions:

Closer examination of individual tank logs reveals a wide variation in the actual emissions degassed from the tank. Some tanks have emissions much lower than expected suggesting a tank relatively free of sludge and product residual that was full to begin with and drained quickly. Others have emissions greater than expected probably because there was a larger vapor space that had time to reach equilibrium and/or significant amounts of sludge and product residual that continued to evaporate while the tank was being degassed. Theoretically, 2.3 air exchanges should reduce emission by 90 percent but the logs indicate an actual reduction rate of only 37 percent. (p. 1-11)

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It found:

There may also be some unquantifiable loss when the contents of the tank are being pumped out of the tank. Vapor may be inadvertently removed if some part of the vacuum hose is above the liquid level.

**Additionally, the degassing logs show that sludge and product residual significantly contribute to the emissions emanating from the storage tanks.** A tank with partial saturation should be able to degas in a shorter time period than a completely saturated tank. However, the logs indicate that degassing actually takes a much longer time. On average, it takes two to three times longer because product residual and sludge continue to release vapors into the tank being degassed. (at p. 1-11)

Since there are many new tanks, and a large increase in throughput, it is not surprising that the DEIR identified additional tank sludge due to the Project:

<sup>59</sup> SCAQMD, Final Environmental Assessment: Proposed Amended Rule 1149 – Storage Tank and Pipeline Cleaning and Degassing, April 2008, [*“The proposed amended rule amendments would instead require a vapor concentration of 5,000 parts per million by volume (ppmv), measured as methane, to be met for at least one hour before allowing the vapors to be vented to atmosphere. This proposed standard will better capture emissions from sludge and product residual remaining in the tanks. Liquid balancing or any other technology that achieves the proposed standard will be allowed.”*] Available at: <http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2008/final-environmental-assessment-for-proposed-amended-rule-1149.pdf?sfvrsn=4>

Periodically, for maintenance, storage tanks are currently emptied and cleaned, resulting in a sludge that generally requires treatment to recover useful product (oil), etc., and disposal (e.g., disposal at a hazardous waste or nonhazardous waste landfill, depending on the concentration of various constituents). The proposed project includes the replacement of existing Tanks 80035 and 80036 with larger new Tanks 300035 and 300036 and the construction of six new crude oil storage tanks. **The proposed project could generate additional amounts of sludge wastes associated with periodic tank cleaning operations.** The daily volume of waste generated during the periodic cleaning of the new storage tanks is expected to be about the same as current operations because no change in the method for tank cleaning is proposed and no more than one storage tank would be cleaned at any time. It takes several days to several weeks to clean storage tanks, depending on the size and the material stored in the tanks. The sludge is expected to remain on-site and will be used as feedstock to the DCU (i.e., recycled on-site); therefore, **no increase in waste disposal** would be expected from operation of the new and modified storage tanks. (DEIR at p. 4-88)

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cont'd.

However, the DEIR only evaluated the additional tank sludge as a generator of hazardous waste, not for potential increased air emissions, despite the Rule 1149 EA's finding "Additional hydrocarbon vapors are released from the sludge and residue while the tank is degassed". (p. 1-10)

The DEIR also did not provide an evaluation of the increased VOC, TAC (Toxic Air Contaminant), and GHG emissions which could occur due to introduction of crude oil with higher vapor pressure compared to existing crude oils at the refinery, such as Bakken crude.

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Furthermore, the previously cited Fox report on the 2014 Negative Declaration identified significant additional tank emissions not included in the DEIR modeling, including roof landing emissions that should be added to the DEIR evaluation. (at pp. 37-40)

G1-81.45

Tank size was listed differently in the modeling compared to other project descriptions

As shown in the table below, several tanks were modeled using lower than nominal tank capacity, which could underestimate emissions in the EPA TANKS modeling.<sup>60</sup>

**Table 6: Several tanks with higher permitted capacity were modeled for air pollution emissions at lower capacity**

Tank ID	Nominal Capacity (Bbls)	
14(C)	360,000*	Modeled at: 346,916 bbls*
31(C)	78,700*	Modeled at 76,596 bbls*
62(C)	100,060*	Modeled at 99,255 bbls*
63(C)	100,060*	Modeled at 99,255 bbls*
64(C)	100,060*	Modeled at 97,796 bbls*
502(C) Heated	1,500,000*	Modeled at 1,211,117 bbls*
959(C)	164,000*	Modeled at 157,371 bbls*

\*Tank modeling at lower volumes than nominal permit volume

G1-81.46

<sup>60</sup> DEIR, Appendix B-3, TANKS modeling which begins at p. B-3-130

Since the existing Title V permit identifies the higher nominal tank size, but emissions were estimated using the lower size, the modeling may result in significantly underestimated emissions. The DEIR should clarify for the above and all tanks why different sizes than nominal were used in air emissions modeling (which is performed by a standard EPA computer program used to estimate air emissions from future tanks). It should clarify whether permit conditions would be added to limit tank size to the same size modeled, or should correct tank sizes used in its air modeling. If the difference is attributable to a different working capacity compared to nominal capacity, permit limits should be set at the working capacity, not the larger nominal capacity.

G1-81.47

**Potentially significant impacts from drastically expanded storage tanks include but are not limited to:**

- The **direct air emissions** from the tanks due to a lack of estimation of emissions from cleaning and degassing (for pipelines as well), also from higher vapor pressure Bakken crude oil with additional TAC components, in addition to potential emission underestimation due to tank size discrepancy;
- The **increased explosion risk from Bakken crude oil storage and handling** (identified by the US Department of Transportation as at increased risk of handling due to higher volatility, not only in railcars);<sup>61</sup>
- The **new storage potential to accommodate Canadian crude oil, providing a path to downstream refinery impacts**, including sulfidation corrosion, increased hazards and emissions from formation of additional H<sub>2</sub>S and other hazardous sulfur compounds
- **The downstream impacts in the refinery due to the accommodation in the tanks of the new crude oils**, and the upstream impacts due to the production and transport of these crude oils.

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G1-81.49

G1-81.50

G1-81.51

**F. Tank expansions also facilitate exports and third party sales; impacts need evaluation**

Tesoro has also announced its intentions to open up its South Coast assets to third party transfers. For example, the previously cited 2014 Deutsche Banke presentation by Tesoro states it will “*Open Southern California terminals to third-party business, Support capture of Southern California logistics synergies, and Expand terminals and add biofuel blending capabilities.*”<sup>62</sup>

G1-81.52

<sup>61</sup> U.S. Dept. of Transportation, Safety Alert -- January 2, 2014 Preliminary Guidance, available at: [file:///C:/Users/Julia%20Mav/Downloads/1\\_2\\_14%20Rail\\_Safety\\_Alert%20DOT%20\(1\).pdf](file:///C:/Users/Julia%20Mav/Downloads/1_2_14%20Rail_Safety_Alert%20DOT%20(1).pdf), Attachment 22

<sup>62</sup> 2014 Tesoro to Deutsche Bank, *id.*, Slide 24



The extremely large additional tank storage and throughput – which is above and beyond the daily crude processing volume for the entire refinery complex, is consistent with Tesoro’s stated plans to pass through its terminals third-party business.

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Tesoro should be required to disclose third-party business activities planned for the tank expansions, as these have downstream impacts. For example, the additional tankage would not only allow Tesoro to change its crude oil slate within its own refineries, it could also sell Bakken or Canadian crude oil to other Los Angeles refineries. Both Valero and Phillips 66 for example, have announced plans to receive these particular crude oils, previously isolated from their refineries. The Tesoro Project could open up *all* the Los Angeles refineries to these crude oils, and could become Tesoro’s export terminal.

Since the Tesoro Savage Vancouver facility is slated at 360,000 bpd (or >130 million bbls/year), the increased throughput permitted for the new tanks at about 420,000 bpd would accommodate the entire daily shipment from the Tesoro Savage terminal. Tesoro could sell the excess crude to other LA refineries, or export it (since Tesoro had to agree not to export crude from the Vancouver facility on the approval of the terminal lease extension<sup>63</sup>).

**IV. A planned switch to Bakken crude oil and likely added tar sands crude, results in environmental impacts that should have been evaluated in the DEIR**

As described above, Tesoro has business plans to import significant quantities of Bakken crude oil not currently present in the refinery. Use of this crude oil is facilitated by many Project components, including greatly increased storage with high vapor pressure limits required by Bakken crude, and through the Tesoro Savage Vancouver Energy Project.

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<sup>63</sup> Previously cited Oregon Public Broadcasting (OPB), April 15, 2016

The switch to Bakken has many significant impacts that should have been evaluated in the DEIR, including problems with processing waxy Bakken crude, corrosion problems, specific problems when blending Bakken crude with heavy crude oils, higher volatility that has caused explosions and fires, and higher levels of toxic components such as benzene. Bakken crude oil is also produced through hydraulic fracturing (“fracking”), which increases emissions of the potent GHG methane, which should have also been evaluated. These additional emissions from extraction add to the total global GHG burden, including impacts to the Los Angeles region.

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The Project is also likely to result in significant imports of Canadian tar sands crude oil, with its own major environmental impacts, including extremely high sulfur content (causing refinery corrosion), use of toxic solvents during transport, refining problems when blending with light crude oils, and major GHG impacts due to strip mining and refining.

**A. Bakken crude impacts are extensive**

**1. Bakken crude oil can be waxy, resulting in transfer problems in marine vessels and storage tanks, requires chemical dispersants**

An article from Hydrocarbon Processing -- *Innovative Solutions for Processing Shale Oils*<sup>64</sup> -- identifies problems in processing oils such as Bakken shale, due to high variability in crude qualities, waxy buildup (paraffinic content), etc. This article specifically identified transfer to refinery tankage as problematic:

*The paraffin content of the shale oils is impacting all transportation systems. Wax deposits have been found to coat the walls of railroad tank cars, barges and trucks. Waxy deposits in pipelines regularly require pigging to maintain full throughput. Bakken shale oil is typically transported in railcar, although pipeline expansion projects are in progress to accommodate the long-term need. These railcars require regular steaming and cleaning for reuse. Similar deposits are being encountered in trucks being used for shale oil transportation. **The wax deposits also create problems in transferring the shale oils to refinery tankage. Fig. 4 shows samples of deposited wax collected from pigged pipelines<sup>65</sup> in shale oil service. [emphasis added]***

G1-81.54

The article provided photos (entitled “waxy deposits removed from shale oil buildup”) which graphically depict the more obvious problems with Bakken crude:



<sup>64</sup> Innovative Solutions for Processing Shale Oils, Hydrocarbon Processing, 7/10/2013, Attachment 23 <http://www.hydrocarbonprocessing.com/Article/3223989/Innovative-solutions-for-processing-shale-oils.html>

<sup>65</sup> Pigging of pipelines refers to inserting mechanical devices known as “pigs” to perform various maintenance operations, including cleaning and inspection.

The article also identified multiple chemical dispersants used to mitigate these problems not only during transportation, but also within refineries where these shale oils are processed:

*To control deposition and plugging in formations due to paraffins, the dispersants are commonly used. In upstream applications, these paraffin dispersants are applied as part of multifunctional additive packages where asphaltene stability and corrosion control are also addressed simultaneously.*

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These chemicals must be identified in order to assess the impacts of their use. The article also found that steam cleaning is used to remove such deposits from railcars. Such activities should be identified and associated impacts evaluated for impacts in marine vessels, pipelines, and storage tanks. Impacts within the refinery must also be evaluated for safety risks.

**2. When Bakken crude oil is blended with heavier crudes, it can cause asphaltene destabilization, resulting in corrosion, fouling of refinery preheaters, heat exchangers, and furnaces, and can cause refinery shutdowns**

The Hydrocarbon Processing article found that asphaltene destabilization can occur when blending shale oil with heavier crudes. This is precisely the kind of blending that could occur due to the Project, through the blending of waxy, light Bakken crude oils, with heavier crude oils processed at the refinery, including California heavy, and potentially Canadian tar sands.

These problems result in fouling of the cold preheat train, fouling of hot preheat exchangers and furnaces, problems in transportation, storage, refinery corrosion, and crude unit shutdowns. These oils are also extracted through fracturing, which have additional and major impacts on water, air, and the global climate. The article finds:

*The refining of shale oil (also known as tight oil) extracted through fracturing from fields such as Eagle Ford, Utica and Bakken has become prevalent in many areas of the US. Although these oils are appealing as refinery feedstocks due to their availability and low cost, processing can be more difficult.*

G1-81.56

*The quality of the shale oils is highly variable. These oils can be high in solids with high melting point waxes. The light paraffinic nature of shale oils can lead to asphaltene destabilization when blended with heavier crudes. These compositional factors have resulted in cold preheat train fouling, desalter upsets, and fouling of hot preheat exchangers and furnaces. Problems in transportation and storage, finished-product quality, as well as refinery corrosion, have also been reported. Operational issues have led to cases of reduced throughput and crude unit shutdowns. The problems encountered with shale oil processing and possible prediction and control strategies will be presented. [Emphasis added throughout]*

The article found use of shale oils was particularly problematic when blended with heavy crudes, which is admittedly planned by Tesoro for its California refinery operations. This blending can cause agglomeration of large molecules onto surfaces inside refinery units which can crack and



leave coke-like deposits if the surfaces are hot.<sup>66</sup> Coke deposits lead to poor operation and can cause shut down of units before planned maintenance periods. All these problems require special handling and planning at the refinery. In addition, the article found shale oils to be highly variable in certain characteristics including for example, its solids content, and others. The article states:

*Due to their paraffinic nature, mixing shale oil with asphaltenic oil leads to destabilization of the asphaltene cores. Asphaltenes are polar compounds that influence emulsion stability. Once the asphaltenes destabilize, they can agglomerate, leading to larger macro-molecules. On hot surfaces, agglomerated asphaltenes easily crack or dehydrogenate and gradually form coke-like deposits.*

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### 3. Bakken crude is volatile and explosive and these characteristics were not evaluated

Unfortunately, Bakken crude oil has been demonstrated as fatally volatile and explosive, as in the case of the tragic explosions at Lac Megantic in Canada, and in other instances.

The U.S. Department of Transportation Pipeline and Hazardous Material Safety Administration issued a safety alert regarding the transport of this type of crude oil in January of 2014, finding that **whether it was transported in railcar or other mode of transport, it represents unique hazards of explosion, fire, and corrosivity**, requiring additional testing, handling, and public information for first responders.<sup>67</sup> Entrained gases require additional testing.

*The Pipeline and Hazardous Materials Safety Administration (PHMSA) is issuing this safety alert to notify the general public, emergency responders and shippers and carriers that recent derailments and resulting fires indicate that the type of crude oil being transported from the Bakken region may be more flammable than traditional heavy crude oil.*

*Based upon preliminary inspections conducted after recent rail derailments in North Dakota, Alabama and Lac-Megantic, Quebec involving Bakken crude oil, PHMSA is reinforcing the requirement to properly test, characterize, classify, and where appropriate sufficiently degasify hazardous materials prior to and during transportation. Proper characterization will identify properties that could affect the integrity of the packaging or present additional hazards, such as corrosivity, sulfur content, and dissolved gas content. These characteristics may also affect classification.*

*PHMSA stresses to offerors the importance of appropriate classification and packing group (PG) assignment of crude oil shipments, whether the shipment is in a cargo tank, rail tank car or other mode of transportation. Emergency responders should remember that light sweet crude oil, such as that coming from the Bakken region, is typically assigned a packing group I or II. The PGs mean that the material's flashpoint is below 73 degrees Fahrenheit and, for packing group I materials, the boiling point is below 95 degrees Fahrenheit. This means the materials pose significant fire risk if released from the package in an accident.*

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<sup>66</sup> Coke is a petroleum product that is mostly the carbon leftover after making gasoline from crude oil. Coke is a fuel, and similar to coal, as an energy source that results in high GHG and criteria pollutant emissions, and significant heavy metal content.

<sup>67</sup> The U.S. Department of Transportation Pipeline and Hazardous Material Safety Administration, January 2, 2014, [http://phmsa.dot.gov/pv\\_obj\\_cache/pv\\_obj\\_id\\_111F295A99DD05D9B698AE8968F7C1742DC70000/filename/1\\_2\\_14%20Rail\\_Safety\\_Alert.pdf](http://phmsa.dot.gov/pv_obj_cache/pv_obj_id_111F295A99DD05D9B698AE8968F7C1742DC70000/filename/1_2_14%20Rail_Safety_Alert.pdf), Attachment 24

... Based on initial field observations, PHMSA expanded the scope of lab testing to include other factors that affect proper characterization and classification such as Reid Vapor Pressure, corrosivity, hydrogen sulfide content and composition/concentration of the entrained gases in the material. The results of this expanded testing will further inform shippers and carriers about how to ensure that the materials are known and are properly described, classified, and characterized when being shipped. In addition, understanding any unique hazards of the materials will enable offerors, carriers, first responders, as well as PHMSA and FRA to identify any appropriate mitigating measures that need to be taken to ensure the continued safe transportation of these materials.

This is a major potential problem that the DEIR must evaluate, at Tesoro's LA region marine terminals, in the expanded pipeline to the refinery, in the storage tanks at the refinery, and in the refinery where it will be used. Since the Lac Megantic rail explosion tragedy, many other crude by rail explosions and spills have happened across the U.S., even after new safety regulations were adopted.

In fact, just one week before the comment deadline on the Tesoro LARIC Project, yet another crude oil railcar bearing Bakken crude oil below up in Oregon along the Columbia River gorge, very near an elementary school and houses (photos shown below). This was just up the Columbia River (about 70 miles) from the proposed Tesoro Savage Vancouver terminal, which would transport large volumes of the same Bakken crude oil, by rail.



KIRO7 Seattle, Oil train derails in Oregon's Columbia River Gorge, Updated Jun 3, 2016 - 2:32 PM, <http://www.kiro7.com/news/local/oil-train-derails-oregons-columbia-river-gorge/320955970>

Updated reporting found that crude oil did reach the Columbia River, after contaminating the local water supply:<sup>68</sup>

“The main sewer line that leads to the wastewater treatment plant was damaged during the derailment,” said David Byers, the Washington state Department of Ecology response manager. So far, cleanup crews have cleaned about 10,000 gallons of crude oil out of the town’s sewage system. Another 32,000 gallons burned off or vaporized in the initial crash, was captured by booms in the Columbia, or soaked into the soil.

<sup>68</sup> Oregon Public Broadcasting (OPB), 6/7/2016, New Spilled Crude Oil Discovered At Mosier Train Crash, <http://www.opb.org/news/series/oil-trains/oregon-oil-train-mosier-derailment-cleanup-spill/> Attachment 25

G1-81.57  
cont'd.



<http://www.kgw.com/news/photos-train-derailment-in-the-gorge/230445267>



Vancouver, Washington proposed Tesoro Savage Bakken and other crude-by-rail to ship terminal, just up the Columbia River from the June 3, 2016 Bakken crude railcar explosion along the Columbia.

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cont'd.

#### 4. Bakken crude refining can also increase levels of acutely hazardous and corrosive Hydrogen Sulfide in the refinery

The Hydrocarbon Processing article also identified increased levels of extremely hazardous hydrogen sulfide (H<sub>2</sub>S) gas as a problem associated with shale oil. Furthermore, when scavenging agents are used to reduce H<sub>2</sub>S presence, these can cause corrosion and form solid deposits inside processing units. The article states:

*Several shale oil production locations have high H<sub>2</sub>S loading. To ensure worker safety, scavengers are often used to reduce H<sub>2</sub>S concentrations. The scavengers are often amine-based products—methyl triazine, for instance—that are converted into mono-ethanolamine (MEA) in the crude distillation unit (CDU). Unfortunately, these amines contribute to corrosion problems in the CDU. Once MEA forms, it rapidly reacts with chlorine to form chloride salts. These salts lose solubility in the hydrocarbon phase and become solids at the processing temperatures of the atmospheric CD towers and form deposits on the trays or overhead system. The deposits are hygroscopic, and, once*

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*water is absorbed, the deposits become very corrosive. These physical properties are responsible for the problems that are being experienced by refineries handling shale oils.*

Hydrogen sulfide is deadly, corrosive, causes odor complaints when released, and its increase in the refinery certainly requires specific evaluation that was absent in the ND.

A report by BakkenShale.com found:<sup>69</sup>

*Is the Bakken producing higher volumes of H2S? That's the question you have to ask yourself when you see pipelines implementing H2S standards for the first time.*

*On May 8, Enbridge submitted an emergency application to the Federal Energy Regulation Commission (FERC) asking to amend its conditions of carriage to 5 ppm of H2S or less. If accepted, Enbridge would have the right to reject crude with higher levels of H2S. . . .*

*Enbridge acted after it found concentrations of 1,200 ppm in a crude tank at its Berthold Terminal. 20 ppm is the limit allowed by OSHA and an average of 10 ppm of exposure is all that is allowed over an 8-hour work day.*

*Both Plains Marketing and Murex Petroleum objected to the FERC application, but it looks as if they solved their differences when Enbridge notified FERC it wasn't planning an outright ban on crude with higher H2S concentrations. The two companies weren't against the change, but were afraid they couldn't comply in the time frame planned.*

The Chemical Safety Board report also identified that H2S was a particularly aggressive corrosive agent.<sup>70</sup> These issues must be evaluated through a full EIR to prevent severe safety risks associated with crude slate changes.

The problem of sulfur corrosion increasing accident risk was unfortunately born out at Chevron Richmond in California last August, when a major explosion barely avoided killing 19 workers, but did send 15,000 neighbors to the hospital after a huge black plume traveling many miles through the Bay Area resulted from the crude unit explosion, which burned for many hours.

Steelworkers testified at the U.S. Chemical Safety Board hearing on the Chevron explosion that such sulfur corrosion is a statewide problem at California oil refineries.<sup>71</sup> The Chemical Safety Board found that the Richmond accident was caused by sulfur corrosion that Chevron had been aware of, and had repeatedly ignored, and the report showed that sulfur content had increased. The photos below show the heavy impact not only in Richmond, but across the San Francisco Bay Area due to this accident.

A discussion of corrosion issues at oil refineries due to increased sulfur content in crude oil, and other important related issues was provided in the attached report of Greg Karras on the Phillips 66 Rodeo refinery EIR.<sup>72</sup> Also refer to the previously cited report of Dr. Fox on impacts of use of

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<sup>69</sup> May 30, 2013, <http://bakkenshale.com/pipeline-midstream-news/bakken-producing-sour-gas-h2s-problem-in-north-dakota/>

<sup>70</sup> *Id.* at p. 33

<sup>71</sup> U.S. Chemical Safety Board transcript of public hearing on Chevron Richmond, CA August 2012 explosion and fire, page 225, <http://www.csb.gov/assets/1/19/0503CSB-Meeting.pdf>

<sup>72</sup> Expert Report of Greg Karras, CBE, 4 September 2013, Regarding the Phillips 66 Company Propane Recovery Project Draft Environmental Impact Report released in June 2013 by the Contra Costa County Department of Conservation and Development

“advantaged.”

These reports demonstrate in further detail the impacts of corrosion demonstrated by the US Chemical Safety Board, causing the massive explosion in August of 2012 in the Chevron Richmond refinery, pictured below. The U.S. Chemical Safety Board report is also available.<sup>73</sup> The significance of the air pollution impacts caused by the Chevron explosion are self-explanatory, in the photos below of the August 2012 explosion caused by the refinery corrosion.



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cont'd.

**B. Another “advantaged” crude oil from Canadian Tar Sands, which Tesoro can import through its Tesoro Savage terminal project, would cause major impacts**

Although Tesoro has stated its main plan is to bring Bakken crude to its West Coast refineries, Tesoro will also have easy access to cheap Canadian tar sands crude through the Tesoro Savage terminal. Tesoro also has options previously discussed for blending with Bakken crude to approximate and replace ANS, and which could also displace heavy California crudes. Canadian tar sands crude is even cheaper than Bakken, as discussed by Bloomberg when talking about Tesoro’s plans to use the cost advantage of Canadian heavy crude in California.

*U.S. West Coast refiners including Tesoro Corp. (TSO) and Valero Energy Corp. (VLO) are developing projects to bring in more oil by rail from reserves across the middle of the U.S. and Canada to displace more expensive supplies. Crude production in PADD 5, which includes California and Alaska, has dropped every year since 2002 while drillers are extracting record volumes from shale in states including North Dakota and Texas.*

*The surging flows of domestic oil to California “reflect a continuing improvement in crude-by-rail receiving facilities here,” David Hackett, president of Stillwater Associates, an energy consultant, said by phone from Irvine, California.*

G1-81.59

<sup>73</sup> Interim Investigation Report, Chevron Richmond Refinery Fire, (which as adopted at the July public hearing) available at: [http://www.csb.gov/assets/1/19/Chevron\\_Interim\\_Report\\_Final\\_2013-04-17.pdf](http://www.csb.gov/assets/1/19/Chevron_Interim_Report_Final_2013-04-17.pdf)

*Lower Costs*

*Crude from North Dakota and Canada trades at a discount to Alaska North Slope oil, which rose 36 cents to \$107.78 a barrel at 9:09 a.m., data compiled by Bloomberg show. Western Canada Select, a heavy, sour blend, gained 36 cents to \$82.88. North Dakota's Bakken crude also gained 36 cents to \$95.28. It costs \$9 to \$10.50 a barrel to send North Dakota's Bakken oil by rail to California, according to Tesoro, the West Coast's largest refiner.*

Note that this article finds both production of Alaska (lighter) crude and California (heavier crude) declining, and that these could be replaced by Bakken (lighter) crude and Canadian (heavier crude). Of course, tar sands crude oil causes major environmental damage during its mining in Canada, as described by the World Resources Institute, which rather mildly states the severe impacts:<sup>74</sup> *“The local and regional environmental impacts of heavy oil and tar sands production can include: significant water consumption, massive earth moving and ecosystem disturbance, increased criteria and other air pollution, and release of heavy metals and toxic materials.”*

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The DEIR must account for both the local Los Angeles region, and global impacts. Canadian tar sands are even heavier than most heavy conventional crudes (higher carbon content, requiring additional energy to process and increasing emissions) and have higher sulfur content. Contaminants must be removed during refining, which increases hazardous materials present within the refinery and can lead to dangerous corrosion within refinery operations units. These also increase the energy needed for refining, resulting in higher greenhouse gas and smog-precursor emissions. The corrosion hazard is increased due to the higher sulfur content, increasing refinery accident risk identified by the US Chemical Safety Board in the last section.

The DEIR failed to evaluate the increases in desulfurization processes within the refinery due to higher sulfur content, as well as additional cracking, coking, and additional use of hydrogen, all of which require more energy and increase criteria and toxic pollutant emissions. The DEIR instead stated that the refinery has limits on the amount of heavy and light crude it can use. This is true, but within the refinery is a large range of crudes, discussed earlier in this report. The point is not the refinery's capability, but the refinery's baseline operations of the past, and how the Project will basically “debottleneck” access to different crude oils, for example by providing new storage (and transportation) of these crudes. The potential for change above the baseline needs evaluation.

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An Oil & Gas Journal article *Special Report: Refiners processing heavy crudes can experience crude distillation problems* (Oil and Gas Journal),<sup>75</sup> also identified the need for additional desalting and temperature controls in order to process unconventional crude oils. This and the other articles identified many problems with processing unconventional crudes, emphasizing that it is not just volume of crude throughput that determines environmental impacts, but also the characteristics or quality of the particular crude oil. The Oil and Gas Journal article also identified a number of differences in the content of unconventional crudes (such as tar sands and others):

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*Heavy crudes have much higher microcarbon residue (MCR), asphaltenes, and metals. As mandated refinery gasoline and diesel pool sulfur specifications take effect, minimizing cat feed hydrotreater (CFHT) feed contaminants becomes more important. In some cases, vanadium in the CFHT feed has*

<sup>74</sup> <http://www.wri.org/publication/content/10339>

<sup>75</sup> Oil and Gas Journal, Special Report: Refiners processing heavy crudes can experience crude distillation problems, 11/18/2002, available at <http://www.ogi.com/articles/print/volume-100/issue-47/special-report/special-report-refiners-processing-heavy-crudes-can-experience-crude-distillation-problems.html>, Attachment 26

*increased from less than 1 ppm to 5-10 ppm with heavy Venezuelan crudes.<sup>1</sup> High feed-stream contaminants can reduce run length to less than half the planned turnaround interval. Optimizing the atmospheric column flash-zone and wash section, and the vacuum unit design can reduce CFHT feed vanadium by 30-40%. . . .*

*Heavy crudes have higher viscosities, some have higher salt content, several have high naphthenic acid content, and they are all more difficult to distill than lighter crude blends. Some upgrader crudes also have lower thermal stability than conventional crudes and higher fouling tendencies due to the increased likelihood of asphaltene precipitation. . . .*

*High chlorides to the atmospheric heater generate large quantities of hydrochloric acid (HCl). Severe fouling in the crude column's top, rapid fouling and corrosion in the atmospheric condenser system, and severe overhead line corrosion often reduce crude runs and unit reliability.*

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A complete inventory and evaluation of specific crude oils previously processed and to be processed at the refinery due to the Project changes needs to be evaluated for environmental impacts.

Additional emissions from transport, piping, tank loading, and in refinery operations, from volatile diluents used with tar sands crudes have not been identified, and should be, with emissions quantified. Diluents can include volatile and toxic compounds such as BTEX VOCs (Benzene, Toluene, Ethylbenzene, and Xylene).<sup>76</sup> In addition to the highly reactive ozone-precursor quality of such diluents, they need to be identified and evaluated as toxic air contaminants, due to carcinogenicity and other health impacts, as well as any potentially explosive compounds.

G1-81.62

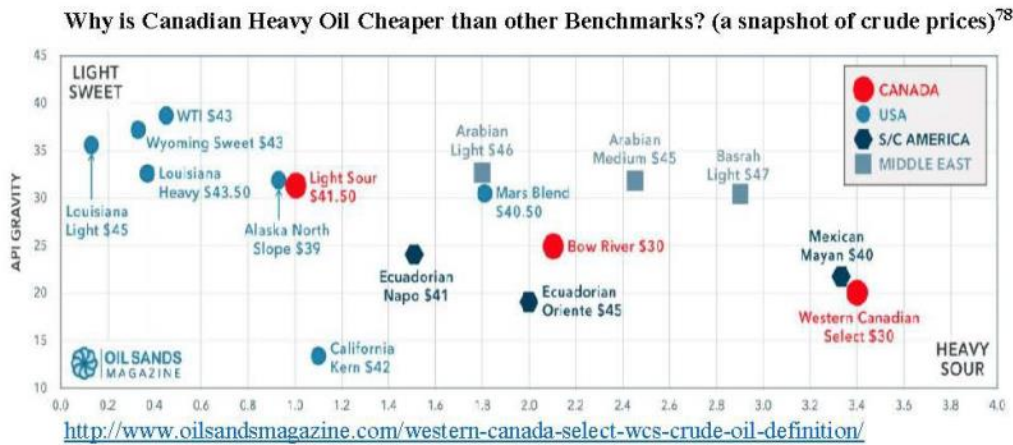
A report by Dr. Phyllis Fox on a crude by rail project to the Valero Benicia California refinery identified many impacts due to switches to “advantaged” crude oils, including increased metals, increased use of toxic BTEX compounds, and many other impacts in transportation and at the refinery due to use of changing crude slates.<sup>77</sup> All the issues identified in this report should be evaluated for the Tesoro ND.

Tesoro is incentivized to include some amount of Canadian crude in its mix, due to the expected new access through the Tesoro Savage terminal, and due to cost-advantage. This could substantially replace the California heavy crudes. For example, the following chart shows Canadian tar sands crude oil as one of the cheapest:

G1-81.63

<sup>76</sup> Comments of NRDC on the Notice of Intent to Adopt a Mitigated Negative Declaration for the Valero Crude by Rail Project, July 1, 2013, on impacts of diluents and other important impacts related to the Valero Benicia crude by rail project in common with the Phillips 66 Los Angeles refinery complex, <http://switchboard.nrdc.org/blogs/dbailey/NRDC%20comments%20letter%20on%20Notice%20of%20Intent%20to%20Adopt%20a%20Mitigated%20Negative%20Declaration%20for%20the%20Valero%20Crude%20by%20Rail%20Project.pdf>

<sup>77</sup> Comments on the Initial Study / Mitigated Negative Declaration, Valero Benicia Crude by Rail, June 1, 2013, Dr. Phyllis Fox, [http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report by Dr. Phyllis Fox.pdf](http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report%20by%20Dr.%20Phyllis%20Fox.pdf)



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**C. Bakken & Canadian Greenhouse Gas emissions were also underestimated**

Because the DEIR Project Description does not acknowledge the crude oil slate switch, it failed to evaluate the emissions, including Greenhouse Gases (GHGs) due to this switch. There are at least two components missing. Because of plans to utilize the Tesoro Savage Vancouver Energy Project to transport significant quantities of Bakken crude oil and likely to also bring Canadian tar sands crude, both should be evaluated as new sources causing GHG impacts related to the Project.

**The impacts evaluated should not only include impacts from use at the refinery complex, but also the lifecycle emissions from the use of these different crude oils.** Such analysis is not only consistent with AQMD policy, but required. In adopting its interim GHG threshold of significance, the AQMD board mandated that *“For the purposes of determining whether or not GHG emissions from affected projects are significant, project emissions will include direct, indirect, and, to the extent information is available, life cycle emissions during construction and operation.”*<sup>79</sup> This is natural, since GHG emissions act on a global scale. They go into the atmosphere and cause climate change globally over a long period of time, and not in a manner that is limited to impacts near the emission sources. The DEIR should evaluate the following:

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**1. Bakken crude oil, though lighter, can significantly increase well to wheel GHG emissions due to large methane extraction emissions**

It is generally assumed that because Bakken crude is lighter, and lower in sulfur, that it requires less energy to refine to produce gasoline and diesel (less cracking, hydrogen production, hydrotreating

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<sup>78</sup> *Crude Oil Vapour Pressure Testing*, January 2012, Vapour pressure testing is an important safety check in the transport, storage and blending of crude oil Hannes Pichler and Klaus Hense, Grabner Instruments, a subsidiary of Ametek, submitted by Ametek Petrolab, <http://www.industrycortex.com/datasheets/profile/2921410/article-vapor-pressure-crude-oil-vapor-pressure-testing>

<sup>79</sup> SCAQMD Board Approval of Interim GHG Threshold, p. 5, available at [http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-\(ghg\)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2](http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2)



to remove sulfur contamination, etc.), so there should be lowered GHG emissions at the refinery.

However, the use of substantial amounts of Bakken at the refinery means significantly increased methane emissions during extraction. While these drilling / extraction emissions occur outside of California, they emit potent greenhouse gases that contribute to increasing climate change, which does not stop at the borders of the Bakken oil fields -- these impacts are already impacting Los Angeles and the entire planet (including drought, heat waves, etc.).

It has been demonstrated that drilling emissions in the U.S. are higher than previously estimated, including emissions of methane (a greenhouse gas that is 72 times stronger than CO<sub>2</sub> over a 20-year period<sup>80</sup>). Generally, the U.S. EPA estimates extraction emissions from the bottom up, based on assumptions about equipment leaks for instance. But a new Harvard study<sup>81</sup> used a top-down approach, to measure actual emissions in the atmosphere. This showed emissions much higher than expected. Other studies that did direct measurement also found higher-than-expected emissions.

This study, (*A large increase in U.S. methane emissions over the past decade inferred from satellite data and surface observations*, Harvard, February 2016), found a major spike in worldwide methane emissions over the last decade, and found the U.S. the likely culprit: “Our results suggest that increasing U.S. anthropogenic methane emissions could account for up to 30–60% of this global increase.”

It also found this has coincided with an in oil and gas production increase, and especially an increase in shale gas production (“The U.S. has seen a 20% increase in oil and gas production [US EIA, 2015] and a nine-fold increase in shale gas production from 2002 to 2014”) although it did not have enough data to determine the exact U.S. sources.

Discussions of this study described its importance: “There was a huge global spike in one of the most potent greenhouse gases driving climate change over the last decade, and the U.S. may be the biggest culprit, according a new Harvard University [study](#).”<sup>82</sup>

Other recent studies also found extremely high levels of methane gas leakage from oil and gas drilling operations. For example, the Science Journal *Nature* reported as follows:<sup>83</sup>

<sup>80</sup> California Air Resources Board, Aliso Canyon Natural Gas Leak Preliminary Estimate of Greenhouse Gas Emissions to Date (As of November 20, 2015) [*“The global warming impact from methane is 25 times and 72 times that of CO<sub>2</sub>, for equal amounts by weight, over a 100 year and 20 year timespan, respectively.”*] available at:

[http://www.arb.ca.gov/research/reports/aliso\\_canyon\\_natural\\_gas\\_leak.pdf](http://www.arb.ca.gov/research/reports/aliso_canyon_natural_gas_leak.pdf)

<sup>81</sup>Turner, A. J., D. J. Jacob, J. Benmergui, S. C. Wofsy, J. D. Maasackers, A. Butz, O. Hasekamp, and S. C. Biraud (2016), A large increase in U.S. methane emissions over the past decade inferred from satellite data and surface observations, *Geophys. Res. Lett.*, 43, 2218–2224, doi:10.1002/2016GL067987, available at:

[file:///C:/Users/Julia%20May/Downloads/Turner\\_et\\_al-2016-Geophysical\\_Research\\_Letters.pdf](file:///C:/Users/Julia%20May/Downloads/Turner_et_al-2016-Geophysical_Research_Letters.pdf) Attachment 27

<sup>82</sup> Study Ties U.S. to Spike in Global Methane Emissions, *Published:* Feb 16, 2016, Climate Central, *Researching and reporting the science and impacts of climate change*, <http://www.climatecentral.org/news/us-60-percent-of-global-methane-growth-20037>

<sup>83</sup> Nature News, 02 January 2013, available at: <http://www.nature.com/news/methane-leaks-erode-green-credentials-of-natural-gas-1.12123>, Attachment 28

G1-81.65  
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Scientists are once again reporting alarmingly high methane emissions from an oil and gas field, underscoring questions about the environmental benefits of the boom in natural-gas production that is transforming the US energy system. The researchers, who hold joint appointments with the National Oceanic and Atmospheric Administration (NOAA) and the University of Colorado in Boulder, first sparked concern in February 2012 with a study<sup>1</sup> suggesting that up to 4% of the methane produced at a field near Denver was escaping into the atmosphere. If methane — a potent greenhouse gas — is leaking from fields across the country at similar rates, it could be offsetting much of the climate benefit of the ongoing shift from coal- to gas-fired plants for electricity generation.

Industry officials and some scientists contested the claim, but at an American Geophysical Union (AGU) meeting in San Francisco, California, last month, the research team reported new Colorado data that support the earlier work, as well as preliminary results from a field study in the Uinta Basin of Utah suggesting even higher rates of methane leakage — an eye-popping 9% of the total production. That figure is nearly double the cumulative loss rates estimated from industry data — which are already higher in Utah than in Colorado.

“We were expecting to see high methane levels, but I don’t think anybody really comprehended the true magnitude of what we would see,” says Colm Sweeney, who led the aerial component of the study as head of the aircraft programme at NOAA’s Earth System Research Laboratory in Boulder.

The figure above reported by Nature in the NOAA study topped 9% losses of gas, even higher than the 4% figure found in the 2012 study. The DEIR needs to include analysis regarding the crude oil shift, and the potential for increased emissions that can occur from shale oil extraction in the Bakken region, and particularly compared to ANS crude that is likely to be replaced with Bakken at the refinery. While in other parts of this report I documented Tesoro’s plans to bring Bakken crude through Vancouver Washington to Los Angeles, it should be further noted that Tesoro is also purchasing crude oil storage and transport facilities *within* the Bakken extraction region, specifically to bring to West Coast refineries. Tesoro announced in December of 2015 its plans for *added* capacity to pump 65,000 bpd of crude oil out of the Bakken (N. Dakota region), and to store and transport this crude for West Coast use.<sup>84</sup> (Acquisitions include the 97-mile BakkenLink crude oil pipeline, which connects to several third-party gathering systems, a 28-mile gathering system in the core of the Bakken, “where most of the drilling in today’s low price environment is being done,” a 154,000 bpd rail loading and a 657,000 bbl storage facility in Fryburg.)

*“We expect our enhanced system to provide Tesoro’s West Coast facilities with cost-effective access to advantaged crude oil and provide producers additional market access. . .”* Tesoro spokesperson Brendan Smith said in an emailed statement.

So Tesoro is not only drastically expanding its LA refinery complex and tank storage system to bring new Bakken crude oil through Vancouver Washington, but Tesoro is specifically creating new infrastructure in the Bakken region for pumping additional Bakken crude oil and providing isolated Bakken producers access to Tesoro’s market.

The impacts must be identified, as a direct consequence of Tesoro’s LARIC Project. As described above, the large U.S. oil boom, identified as a potential reason for the worldwide increase in

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<sup>84</sup> *Tesoro plans to purchase Bakken pipeline, storage*, Jessica Holdman, Bismarck Tribune, Dec 17, 2015, <http://tsocorp.com/customers-and-suppliers/wholesale/terminals/>, Attachment 29

G1-81.65  
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methane emissions over the last decade, must be evaluated as a direct consequence of this Project. Tesoro's activities in the Bakken, Vancouver, and LA, do not stay in these regions, but have local and global impacts, including impacts in LA due to adding to the burden of climate change, and other impacts.

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**2. Importing additional extremely heavy, high sulfur Canadian Tar Sands crude oil could significantly increase GHG emissions**

Although Tesoro's main strategy is importing Bakken crude oil, as previously discussed, Tesoro will also have access to significantly increased levels of Canadian tar sands crude through the Tesoro Savage Vancouver project. If this Canadian crude replaces a crude at the Tesoro refinery average shown in the previous estimation of about 1.5% sulfur, the Canadian crude would increase the percent sulfur up to 3.5 or more percent sulfur for that number of barrels. This would introduce a larger mass of sulfur into the refinery compared the past baseline (and would increase the hazardous hydrogen sulfide in the refinery).

It would also increase the desulfurization processing needed, the processing in the Sulfur Recovery Unit, and the energy use and resultant emissions of those processes. Increased energy equates to higher GHG emissions. Since the average sulfur content of crude oil in the refinery is nowhere near 3.5%, introduction of tar sands crude in significant quantities would have to increase the sulfur percent unless other reduction measures to reduce intake of the average sulfur in other crudes was taken. So GHGs would also have to increase due to the energy needed to remove this additional sulfur. This example shows why a specific crude oil sulfur baseline is needed, and the potential for that baseline to change, because this impacts the amount of desulfurization downstream.

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If the newly introduced Canadian crude volumes replaces a crude at the refinery average API gravity of 29 degrees previously estimated, with a heavier Canadian crude (for example WCS) with API 20.3,<sup>85</sup> this would significantly increase the gravity from a moderate to a heavy crude (since API gravity is a reverse scale, so that lower numbers equals higher gravity). This would require additional cracking and coking to accommodate the crude, and require heated tank storage with mixing equipment.

As above, this increased activity means increased energy use, which equates to higher GHG emissions for that portion of the crude replacement, unless efforts were taken to offset this increased gravity (higher carbon content) by lowering the average of other crudes introduced. This example shows why a specific API gravity baseline is needed for the refinery, because it impacts energy use downstream.

Even if Tesoro replaced/s some of its use of California heavy, high sulfur crude with Canadian crude, this could still increase the refinery sulfur average and heaviness, since Canadian crude is one of the most extreme crudes oils by both counts.

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<sup>85</sup> *Id.*, *The North American Crude Boom*, Platts, at Slide 21

While the refinery can also mix crudes to get an average similar to the existing refinery previously described (replacing ANS with a mix of Canadian and Bakken), that does not necessarily mean there will be no impacts because crude oils have other qualities, such as TAN, benzene, paraffin content, etc., which affects the energy use at the refinery. For all these reasons, it is necessary to provide a baseline of specific crude oils used, and a specific baseline of Canadian crudes used, projected use in the future, and to evaluate how this would affect storage tanks, cracking, coking distillation, heaters, boilers, desulfurization, sulfur recovery, etc.

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G1-81.67

Crude oil extracted from Canadian tar sand pits, like this one, release more carbon emissions than crude from U.S. sources. (from UC Davis news, cited below)

Energy use from well to wheels (from the strip mining extraction, transport, refining, and use the fuels produced) for Canadian Tar Sands is one of the worst energy users. Overall, introduction of Canadian tar sands crude oil was found in a 2015 study to cause about 20% more GHGs than domestic crude oils:<sup>86</sup>

Gasoline and diesel fuel extracted and refined from Canadian oil sands will release about 20 percent more carbon into the atmosphere over the oil's lifetime than fuel from conventional crude sources in the United States, according to a study by the U.S. Department of Energy's Argonne National Laboratory; the University of California, Davis; and Stanford University.

<sup>86</sup> Emissions from Canada's oil-sand crude higher than those from U.S. sources, Kat Kerlin on June 25, 2015, published in UC Davis news at: <https://www.ucdavis.edu/news/emissions-canadas-oil-sand-crude-higher-those-us-sources>, Attachment 30

Almost any amount of this crude introduced by Tesoro could have a significant impact, and should be tracked. A 20% increase in emissions at the refinery for the portion of fuels produced due to import of Canadian tar sands crude could easily exceed AQMD thresholds of significance, and should be evaluated in the DEIR.

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cont'd.

**V. Other emissions and environmental impacts are missing from the DEIR**

Missing Project emissions or missing evaluation in summary below need to be corrected in the DEIR, and are discussed further in this section:

- **Flares and Pressure Relief Devices:** A dozen new connections of equipment to Pressure Relief Devices and flares were counted with zero potential to emit, based on the flare capacity to handle these gases, but this approach failed to evaluate the potential to emit during shutdowns and other upsets when these added volumes of gases have no place to go but to be burned in the flare and emitted as pollutants;
- **Heaters and Boilers:** The heat input for DCU Heater H-100 was increased 20%, but criteria pollutant emissions were counted as lowered.
- **42-inch pipeline expansion from marine terminals** to new storage tanks described in the 2014 Negative Declaration disappeared from discussion in the DEIR, despite a description that some down-pipe sections within the refinery will expand.
- **FCCU:** The FCCU shutdown was identified by the State of California as part of the environmental conditions of approval for Tesoro's purchase of BP, and should not receive pollution credits.
- **Earthquake fire and other risks:** Especially given the high earthquake and related hazards, and high probability of major earthquakes during the Project lifetime, special attention is needed to fully evaluate these major risks that are increased due to the Project.

G1-81.68

**A. Flaring emissions are already large; new pressure relief connections to flares will increase emissions but were counted as zero, despite permits directing burning gases in flares**

**1. Tesoro existing flare baseline emissions are already large**

**Oil refinery flares are major emissions sources in the LA Basin**, emitting many thousands of pounds per year, and regularly thousands of pounds in one day, including emissions of SOx, VOCs, NOx, CO, and PM2.5/PM10. Flares are designed to burn gases when malfunctions occur that require that process vessels must shut down, or during smaller process upsets, and during planned shutdowns. This is in order to avoid dumping dangerous gases *directly* to atmosphere, however, the U.S. EPA and the AQMD found many ways to minimize and entirely prevent flaring, and set regulations requiring this (including compressing and recycling gases, and preventing repeat malfunctions).

G1-81.69

AQMD regulations require that flaring be minimized, and flaring emissions have gone down substantially compared to before the control regulation was adopted. However, major flare events

emitting thousands of pounds of pollutants are still very common in the South Coast District. The AQMD described flares as follows in its Final Staff Report on Rule 1118.<sup>87</sup>

At petroleum refineries, flares have historically been used to dispose of combustible gases resulting from emergency relief, overpressure, process upsets, startups, shutdowns and other operational and safety reasons to prevent direct release of toxic and/or odorous substances to the atmosphere. In recent years, U.S. Occupational Safety and Health Administration (OSHA) and U.S. EPA have become more concerned with refinery operation, resulting in tighter regulations on safety and emissions control and enforcement actions such as Consent Decrees, as shown before. **Furthermore, smoke, noise, glare and odors sometimes associated with refinery operations may, and at times have impacted the surrounding communities,** leading to an increase in the involvement of community and environmental groups in the regulatory process of controlling refinery flares. (emphasis added)



3-9-2010 Tesoro Power Outage caused Flaring, billowing smoke, neighbors reported explosions told hearing explosions, AQMD reported to CBE they had no equipment for air samples that night

**Tesoro LA is no exception, as shown in the flaring photo above, and in the 2014 and 2015 Tesoro flaring emissions of over a thousand pounds per day, charted below.** Note that the size of the largest events increased from 2014 to 2015. The chart does not include many smaller events, or continuous flare emissions from pilot and purge gases, but annual totals are shown to the right of the chart. Flare data used to produce this chart was provided to CBE on 5/13/2016 by the AQMD, attached.<sup>88</sup> Total annual emissions are available on the AQMD website.<sup>89</sup> The AQMD data also

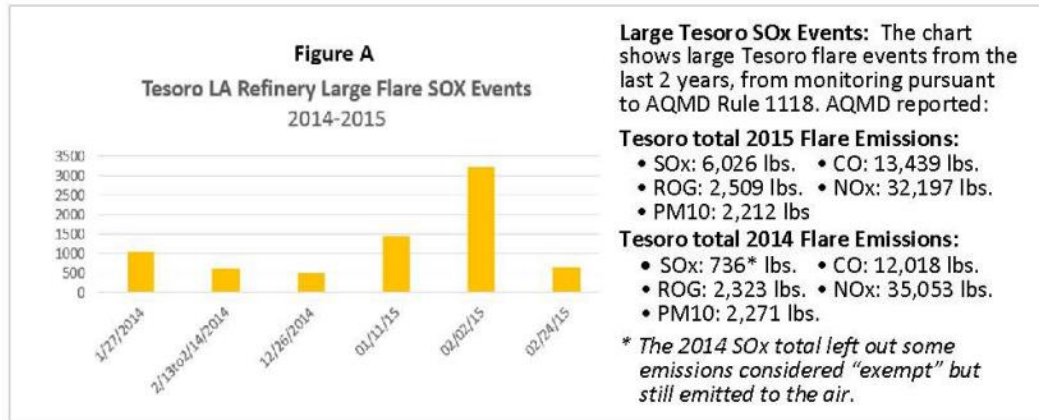
<sup>87</sup> Final Staff report for Proposed Amended Rule 1118 – Control of Emissions from Refinery Flares, October 2005, at p. II-1, available at <http://www.aqmd.gov/docs/default-source/compliance/rule-1118/rule-1118-staff-report.pdf?sfvrsn=2>

<sup>88</sup> Attachment 31: R1118EVENTDATAFORM\_2015Q1, Attachment 32: LAR\_R1118\_REPORT\_4Q14\_SCAQMD, Attachment 33: LAR\_R1118\_REPORT\_1Q14\_SCAQMD

<sup>89</sup> Total Tesoro flare emissions available at SCAQMD website: Tesoro Carson Refinery (formerly BP Carson) 2015 Rule 1118 Quarterly Flare Emissions: [http://www.aqmd.gov/docs/default-source/compliance/rule-1118/refineries/tesoro-refinery-carson/2015-tesoro-carson-flare-data-\(formerly-bp-carson\).pdf?sfvrsn=12](http://www.aqmd.gov/docs/default-source/compliance/rule-1118/refineries/tesoro-refinery-carson/2015-tesoro-carson-flare-data-(formerly-bp-carson).pdf?sfvrsn=12) , and Tesoro Refinery Carson (formerly BP Carson) 2014 Rule 1118 Quarterly Flare Emissions:

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showed events with large CO emissions, for example 1450 lbs. (2/4/15), and 1172 lbs. (2/2/15), in addition to at least 100 lbs. each of PM10, ROG (VOCs), and NOx on these dates and others.



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**2. The Project adds a dozen new vents to the flare, with large potential emissions**

The DEIR should provide flare baseline emissions and identify a realistic flare Potential to Emit far above zero, due to the many new connections of air pollution sources to the flares. A Potential to Emit of zero given in the DEIR is not possible, since refineries must at the least vent through flares during planned shutdowns, where the gases have nowhere to go but to the flare (they will no longer be contained inside the refinery). Although some refineries have identified the possibility of new innovations to store some gases within vessels even after shutdown, this involves increasing the pressure rating of these vessels through physical modification or new construction. No such proposal was provided in the Tesoro LARIC Project.

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In addition to planned shutdowns, it is much more likely that there will also be many unplanned shutdowns and upset conditions sending both large and small volumes of hydrocarbon and sulfur-laden gases to the flares, as is currently the case, born out by the AQMD flare data provided to us.<sup>90</sup> When refinery gases are flared, they emit criteria pollutants. Instead, the DEIR allowed the use of the Tesoro assumption that flare events will never happen. This is worse than unrealistic – it grossly underestimates the Potential to Emit in flares.

**Data provided available in the draft Title V engineering calculations show a very large Potential-to-Emit VOCs (many thousands of pounds per hour) from new Project components.**

G1-81.71

<file:///C:/Users/Julia%20May/Desktop/jan12%20to%20Apr16%20NEW/refineries%20Tesoro/Tesoro%20BP%202016%20integration%20DEIR/background%20info/2014-tesoro-refinery-carson-flare-data.pdf>, Attachments 34 and 35

<sup>90</sup> The full AQMD flare monitoring data for Tesoro makes up almost 70 separate spreadsheets and so is not reproduced here – only the monitoring data charted in Figure A above is attached.

For example, the table below from the draft Title V permit show “General Common Release Scenarios” for Tesoro’s No. 5 Flare. It states:<sup>91</sup>

**“The PSVs tied into the No. 5 Flare have multiple relieving cases, either in unique relief or as part of a common relief scenario. Common release scenarios, which impact flare size, are described in the table below.”**

**No. 5 Flare General Common Release Scenarios**

Common Release Scenarios	Lbs/hr	MW	Flare Tip Mach No.
Total Refinery Power Failure	1,450,000	35	0.57
Refinery Cooling Water Failure (No. 8 Cooling Tower Failure)	364,005	30	0.15
Polypropylene Plant Power Failure	886,835	38	0.32
Fire (largest fire circle release – Unit 7600 Fire Circle A)	479,170	42	0.16

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cont’d.

The quote and list shows new PSVs (Pressure Safety Valves, also called Pressure Relief Devices (PRDs)) vented for example to Flare No. 5. This example shows from 364,005 to 1,450,000 lbs/hr of gases that can release to this one flare. Since flares are specifically made to burn hydrocarbon gases during refinery shutdowns and upset conditions (in order to avoid dumping these gases directly to the atmosphere through the PRDs), we know that the lbs/hr above include significant percentages of hydrocarbons, and many streams include high concentrations of sulfur compounds.

The lbs/hr figures above refer to the gases *sent* to the flare system, not what is *emitted* by the flare after combustion. To determine the emissions out of the flare, a certain VOC destruction efficiency is assumed. The SCAQMD does not set a specific hydrocarbon combustion or destruction efficiency in its refinery flare control regulation, but the Bay Area Air Quality Management District (BAAQMD) does in its refinery flare monitoring regulation (98% for most cases, and 93% for low-BTU gases).<sup>92</sup> At 98%, this means only 2% of hydrocarbons remain after burning in the flare. (The rest comes out mainly as the greenhouse gas CO<sub>2</sub>).

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Using 98% destruction efficiency (and assuming these gases are 100% hydrocarbon) results in the following Potential to Emit for each of these scenarios:

- 29,000 lbs/hr of hydrocarbons (ROG or VOCs) - Total Power Failure, (2% of 1,450,000)
- 7,280 lbs/hr during a Cooling Tower failure, (2% of 364,005)

<sup>91</sup> Draft Title V Permit, p. 62 (147<sup>th</sup> p. of pdf)

<sup>92</sup> BAAQMD, Miscellaneous Standards of Performance, Rule 11, Flare Monitoring at Petroleum Refineries, Rule 12-11-401 Flare Data Reporting Requirements, section 401.9: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf?sfvrsn=4> [“For each day and for the month provide calculated methane, non-methane and sulfur dioxide emissions. For the purposes of emission calculations only, a flare control efficiency of 98 percent shall be used for hydrocarbon flares, and a flare control efficiency of 93 percent shall be used for flexi-gas flares or if, based on the composition analysis specified in Section 12-11-502, the calculated lower heating value of the vent gas is less than 300 British Thermal Units/Standard Cubic Foot (BTU/SCF).”]



- 17,737 lbs/hr during a Polypropylene Plant power failure, (2% of 886,835) and
- 9,583 lbs/hr during a fire. (2% of 479,170)

If the gas volumes routed to the flare contain a smaller percentage of hydrocarbons (not 100%, but for example, 30%), then emissions would still be thousands of pounds per hour after burning in the flare:

- 8,700 lbs/hr of hydrocarbons (ROG or VOCs) - Total Power Failure,
- 2,184 lbs/hr during a Cooling Tower failure,
- 5,321 lbs/hr during a Polypropylene Plant power failure, and
- 2,875 lbs/hr during a fire.

In fact, flare combustion efficiency can go far below 98%<sup>93</sup> (down to 70%<sup>94</sup> or even lower), which would mean that emissions of VOCs would go far *higher* than in the examples above. For example, even with efficiency as high as 90%, 10% of the VOCs would remain uncombusted and be emitted, so emissions above would be five times higher than when only 2% remains. And at 70% destruction (with 30% VOCs remaining), emissions would be 15 times higher than when 2% remains. Importantly, a study in Houston found that flaring emissions combustion could go down, and that this and other variability (could result in significant increases in ozone formation in the region.<sup>95</sup>

**The DEIR needs to provide more information characterizing the percent of hydrocarbons and sulfur compounds present in the vessels that would vent through new PRDs to the flares, and provide a full emissions analysis now completely missing.** Instead, the assumption of zero emissions is conclusory and without a basis.

Sulfur compounds are emitted differently by flares compared to hydrocarbons – they are not destroyed in the flare, but instead transformed to other sulfur compounds. For example, most of the H<sub>2</sub>S turns into Sulfur Oxides. In other words, all the sulfur going to the flare is emitted as a sulfur

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<sup>93</sup> For example, Dow Chemical, McCready, 2001, *Industrial Flares, Linking Plume Dispersion with Combustion*, Attachment 36

<sup>94</sup> *Theoretical and observational assessments of flare efficiencies*, Leahey, J Air Waste Manag Assoc. 2001 Dec; 51(12):1610-6. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/15666465> Attachment 37

<sup>95</sup> Web publication April 05, 2012, *Impacts of Emission Variability and Flare Combustion Efficiency on Ozone Formation in the Houston–Galveston–Brazoria Area*, Pavlovic et al, Center for Energy and Environmental Resources, The University of Texas at Austin, *Ind. Eng. Chem. Res.*, 2012, 51 (39), pp 12593–12599, DOI: 10.1021/ie203052w, Abstract: [*“Recent studies in the Houston–Galveston–Brazoria (HGB) area of Texas have suggested that industrial flares exhibit high temporal emissions variability and that flare combustion efficiencies could vary with air and steam assist rates, particularly at lower flow rates, and when low heating value gases are combusted. This work examined the difference in ozone formation potential associated with accounting for temporal variability in flaring emissions, as opposed to assuming the same amount of mass was emitted at a constant, average flow rate. The temporal variability in flare emissions was found to lead to differences in ozone concentrations of as much as 27 ppb in the HGB area. This work also examined the potential ozone formation impacts of flare combustion efficiencies of less than 98–99%, applied to 25 flares throughout the HGB region. Deterioration in combustion efficiency (CE) was found to affect ozone concentrations by a few to more than 50 ppb, depending on the level of the assumed CE. While the ozone impacts associated with temporal variability in emissions typically lasted a few hours, consistent with the length of large flaring events, lowering of the CE significantly increased emissions and ozone concentrations over periods ranging from several hours to several days for some flare types. Thus, changes in CE may affect ozone concentrations for longer durations and over larger spatial extents than episodic emissions events.”*], available at: <http://pubs.acs.org/doi/abs/10.1021/ie203052w?src=recsys&journalCode=iecred>, Attachment 38

compound, generally in the form of SOx. The amount of SOx emitted depends on the percent of sulfur compounds in the gases sent to the flare. The DEIR should identify the percent of sulfur compounds present in gases that would be vented through the new PRDs to the flares. Sulfur oxides emitted by flares are less deadly than H2S entering the flare, but SOx (such as SO2) are still very hazardous pollutants even during short exposures. U.S. EPA states:<sup>96</sup>

**Current scientific evidence links short-term exposures to SO<sub>2</sub>, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms.** These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing.) . . . SOx can react with other compounds in the atmosphere to form small particles. These particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death. EPA's NAAQS for particulate matter (PM) are designed to provide protection against these health effects.

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The Title V permit provided another list of pounds per hour potential to emit from PSVs to the flare below, including 5 new PSVs connected to the Naphtha Hydrodesulfurization Unit. This process has high concentrations of sulfur, because the purpose of hydrodesulfurization is to remove sulfur contamination from hydrocarbons. It also shows five new PSVs for the new LPG rail loading / unloading rack. This should be a lower sulfur, but with significant hydrocarbons (VOCs). Using the BAAQMD 98% destruction efficiency of VOCs in the relief loads would result in each of the connections having the flare emissions listed below showing two cases (100% VOCs in PRV vent gas, and 30% VOC in vent gas). This does not show higher emissions that would occur from multiple flares relieving at once (a common occurrence), or SOx and other criteria pollutants.

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<sup>96</sup> <https://www3.epa.gov/airquality/sulfurdioxide/health.html>

**Table 7: Potential flare emission increases are substantial**

Flare Connection /PSV#	Relief Load <sup>97</sup> (lbs/hr)	1) 98% destruction of VOCs in flare (assuming vent gas is 100% VOC), lbs/hr	2) 98% destruction of VOCs, at 30% VOC in vent gas, lbs/hr
Naphtha Hydro-desulfurization Unit			
1/ 44PSV-5045	113,611	2,272	682
2/ 44PSV-5046	19,903	398	119
3/ 44PSV-5043	53,735	1,075	322
4/ 44PSV-5042	38,252	765	230
5/ 44PSV-5051	14,577	292	87
LPG Railcar Loading/Unloading Rack			
6/ 74PSV-5007	6,665	133	40
7/ 74PSV-5008	3,998 or 11,729*	80 or 235	24 or 70
8/ 74PSV-5009	44,564	891	267
9/ 74PSV-5013	119	2	0.7
10/ 74PSV-5108	9,590	192	58
Alkylation Unit			
11/ 76PSV-5008	147	3	0.9
12/ 76PSV-5009	116	2	0.7

\* This device was given two different emissions scenarios, dependent on cause of the release.

Instead of calculating potential to emit, the Title V document which provided the basis for the DEIR referred to assumptions in a Tesoro study, identified as an Attachment #6. Attachment #6 did not quantify potential flare emissions, instead it evaluated whether common relief scenarios of the PSVs vented volumes of gases large enough to require a larger flare to burn this quantity of gases. It determined that the new PRDs did not cause a need for an increased flare size: *“None of the new PRDs contribute to the flare load for any of the common release scenarios that impact the flare size.”*<sup>98</sup> No mention was made of emissions, for example, during refinery shut down due to the new connections.

PSVs are safety devices, for the *purpose of venting* quickly to avoid overpressure of vessels. They are designed and sized to allow very fast depressurization to avoid over-pressure conditions in refinery vessels. They are not designed to prevent emissions, but instead, to ensure that gases *are* emitted (in these cases to the flare).

**The new Project PSVs vent from refinery vessels containing VOCs and sulfur gases, to flare systems.** Inside the refinery, large compressors normally keep refinery gases to a smaller volume and “recycle” or use these gases, for example, as fuels. However, when the refinery has to shut down for planned maintenance, or for emergencies, these flares in turn are designed to burn very large quantities of gases quickly. They are emitted out of the flare stack flame to the air during

<sup>97</sup> Draft Title V analysis, p. 63, (148<sup>th</sup> p. of pdf)

<sup>98</sup> Tesoro Application (A/N) 575841 for the Project, provided by the AQMD as part of the LARIC Draft Title V review, at 780<sup>th</sup> page of the pdf, provided May 12<sup>th</sup> 2016 to CBE by email from the AQMD (Danny Luong).

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emergency and planned shutdown, and for smaller pressure releases. John Zink Co. LLC, the main refinery flare designer and manufacturer used by oil refineries, describes the process where gases go to the flare and are burned during upset conditions.<sup>99</sup>

**A flare system** consists of a vapor header that collects the flare gases from various sources, a knockout vessel, a liquid seal vessel, and the flare itself. . . .

When all compressors are operating at full capacity and if the process vent flow rate continues to increase, flare gas will begin to pass through the liquid seal and flow to the flare stack. Therefore, the safety function of the flare system is maintained in the event of process upset conditions.

Consequently, the Tesoro Attachment #6 and the AQMD Title V evaluation evaluates whether the flare systems can handle the large amounts of gases to be added through venting the new PSVs, and whether this could cause an “adverse impact” on the flare, meaning exceeding the flare’s capacity to burn the gases, since flares have limits on how much gas they can handle at once time. Overwhelming a flare causes smoking and poor combustion.

The conclusion reached by Tesoro, and the District in the permit, is that the *capacity* of the flare systems would not be exceeded. In other words, the flare is sized large enough to handle burning the gases from all the new PSVs that will be connected due to the new Project. This does not attempt to provide any information or evaluate emissions resulting due venting of PSVs to the flare, especially during a large scale startup or shutdown, which happens periodically. The documents only state:

**“The additional load to the No. 5 Flare from the new PSV tie-ins** from the Naphtha Hydrodesulfurization Unit, LPG Railcar Loading/Unloading Rack, and Alkylation unit **will not cause the capacity of the flare to be exceeded.**” [emphasis added]

In another case, the Title V permit states:<sup>100</sup>

**The new PSVs do not contribute to any of the common relief scenarios that impact flare size.** Thus, they do not change the back pressures on existing PSV during any of the common failure scenarios.

Again, the discussion here is regarding whether the flare is sized large enough to handle the relieving PSVs, not whether relief of the new PSVs has the potential to add significant emissions during startup, shutdown, maintenance, malfunction, or other flaring events.

Clearly burning thousands of pounds per hour of refinery gases, as shown above, would result in significant criteria pollutant impacts that were not identified in the DEIR. Avoiding exceeding flare capacity does not equate to avoiding emissions. If it did, then the existing refinery flare emission baseline would show zero emissions, which of course, is not the case.

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<sup>99</sup> Process Diagram, John Zink Hamworthy Combustion Flare Gas Recovery Unit, <http://www.johnzink.com/products/flare-gas-recovery/process-diagram/> Attachment 39

<sup>100</sup> Draft Title V permit analysis, 148<sup>th</sup> pdf page, also as originally provided by Tesoro’s report to the AQMD in its Title V application, the previously cited Attachment 6 (A/N 575841 at 782<sup>nd</sup> page of pdf)

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The Naphtha Hydrodesulfurization unit listed above is a high-sulfur process, so sulfur compounds present in these gases vented to the flare would result in high SOx emissions. As shown in the baseline data reported by Tesoro to the District and charted earlier, in 2014 and 2015 Tesoro emitted over a thousand of pounds of SOx in a day from its flares, even without these new connections of PRDs to the flares. Adding these new connections has the potential to cause significant increased SOx emissions that need to be quantified.

The AQMD baseline flare data for 2014 and 2015 also showed thousands of pounds of CO, NOx, and PM10, and VOCs emitted by Tesoro, so adding twelve new PSV connections has a potential to also cause thousands of new pounds per year, and from hundreds to thousands of pounds per day of these pollutants individually.

Oil refinery flaring with large emissions continues to be common in the South Coast District due to planned and unplanned shutdowns, power outages, fires, and explosions. The DEIR needs to evaluate and include in the Project assessment, emissions from episodic events including malfunctions and startup/ shutdown events, due to the Project. Furthermore, startup/shutdown emissions are required to be analyzed as part of CEQA, and in federal permitting.

A report submitted to the U.S. EPA (Emission Estimation Protocol for Petroleum Refineries) found that flare SSM (Startup, Shutdown, and Maintenance) emissions can be very large and accurate accounting of these is critical:<sup>101</sup>

When the sulfur recovery plant is in operation, the sulfur plant vent flow rate is fairly small so that the SO2 emissions from the sulfur recovery plant are also relatively small. If the sulfur recovery plant must be taken offline due to an upset or malfunction, the sour gas may be temporarily directed to a backup sulfur recovery unit or directed to a flare or the thermal oxidizer. **If the sour gas in these cases is sent to a flare or thermal oxidizer, the SO2 emissions can be very large. As such, it is critical to include accurate accounting of SO2 emissions during startup, shutdown, or malfunction (SSM) events associated with the sulfur recovery plant.** (at p. 5-17)

This point applies not just to sulfur recovery plants, but to any potential flaring events with a high sulfur percent. However, the Project does have the potential to increase use of the sulfur recovery unit, because of additional desulfurization, which down the line ends up in the sulfur recovery unit (SRU). The SRU must regularly go through startup, shutdown, and maintenance, so these flare emissions must be evaluated too.

This report also found:

Emissions from flares consist of a fraction of the hydrocarbons in the flare gas (e.g., CH4, CO, VOC, and specific organic HAP) that are not combusted in the flare; SO2 resulting from the oxidation of sulfur compound impurities, such as H2S, in the gas stream; and CO2

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<sup>101</sup>May 2011, Submitted to: Office of Air Quality Planning and Standards U.S. Environmental Protection Agency Research Triangle Park, by: RTI International, excerpts in Attachment 40, full report available at: [https://www3.epa.gov/ttnchie1/efpac/protocol/Emission Estimation Protocol for Petroleum Refinerie 052011.pdf](https://www3.epa.gov/ttnchie1/efpac/protocol/Emission%20Estimation%20Protocol%20for%20Petroleum%20Refinerie%20052011.pdf)

from the combustion process. Flares are also expected to produce NOx emissions and may produce PM (soot) if combustion conditions are not adequate. **A complete emissions inventory will include estimates for all these compounds (the specific organic HAP [Hazardous Air Pollutants] will vary based on the composition of the gas being flared).** (at p. 6-1)

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In conclusion, the DEIR needs to provide specific percentage of VOC (ROG) content, sulfur percent, other gases such as hydrogen, inert gases, etc., present in the vessels that are connected by PSVs to the flares, and publicly provide the emissions assessments and assumptions based on the full potential to emit during planned and unplanned events, startups, and shutdowns for all flares due to the Project. **There is a significant potential for very large flaring events, in the hundreds to thousands of pounds per day of each of SOx, VOCs, CO, NOx, and PM2.5/PM10.** There is also a potential for significant emissions of Toxic Air Contaminants from flares that needs to be assessed, especially when combustion is poor.

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**3. The Project permit conditions do not limit flare emissions to zero, they guarantee burning gases from the new relief valves in the flare, and causing emissions during startup, shutdown, turnaround, and “essential operating needs”**

**The proposed permit conditions in no way limit flaring emissions to zero, cannot prevent large flaring emissions, and in fact specify activities that will vent gases to be burned in flares.**

The Draft Title V permit identifies the following conditions for various pieces of equipment connected to the flare (for example, the 44<sup>th</sup> page), which finds that during Emergencies, Planned Shutdowns, Startups, or Turnarounds, and for “Essential Operating Needs,” vent gases may be “directed to a flare” (burned in the flare by the pilot flame which is always on, and which allows ignition of the gases directed to it). This is consistent with the requirements of AQMD Flare Control Regulation 1118, which allows flaring for these activities.<sup>102</sup>

Vent gases from all affected devices of this process/system shall be directed to a gas recovery system, **except for the venting of gases from equipment specifically identified in a permit condition, and for the following events for which vent gases may be directed to a flare:**

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- 1) Vent gases **during an Emergency** as defined in Rule 1118;
- 2) Vent gases **resulting from Planned Shutdowns, Startups and/or Turnarounds** as defined in Rule 1118, provided that the owner/operator follows the applicable options and any associated limitations to reduce flaring that were identified, evaluated and most recently submitted by the owner/operator to the Executive Officer pursuant to Rule 1118, or any other option(s) which reduces flaring for such events; and
- 3) Vent gases due to and resulting from an **Essential Operating Need**, as defined in Rule 1118.

**The evaluation of options to reduce flaring** during Planned Shutdowns, Startups and/or Turnarounds shall be updated annually to reflect any revisions, and submitted to the Executive Officer in the first quarter of each year, but no later than March 31st of that year.

<sup>102</sup> AQMD, Regulation 1118, Control of Emissions from Refinery Flares, available at: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf?sfvrsn=4>

This process/system shall not be operated unless its designated flare(s) are in full use and have valid permits to receive vent gases from this process/system.

Vent gases shall not be released to the atmosphere **except from the existing safety devices or relief valves** on the following equipment: . . .

These conditions also make it clear that evaluation of options for “reducing” (not eliminating) flaring should be done once a year. These permit conditions in no way eliminate emissions from PRVs and flares. In fact, they guarantee them during flare combustion of vent gases for startup, shutdown, turnaround, and essential operating needs.

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The Draft Title V permit also identifies exemptions for flare systems as part of NOx and SOx RECLAIM program emissions reductions:<sup>103</sup>

Reg. XX - Regional Clean Air Incentives Market (RECLAIM)

This facility is subject to RECLAIM requirements. The No. 51 Vacuum Distillation Unit Heater (D63) is a Major NOx source and is therefore required to be monitored by a Continuous Emissions Monitoring System (CEMS). . . .

**Under §2011(i) and §2012(k), monitoring, reporting and recordkeeping for NOx and SOx is not required for gas flares. Therefore, these rules do not apply to the flare systems. Continued compliance with the requirements of this rule is expected.**

G1-81.78

The Potential to Emit from new PRV connections to flares will increase the Potential to Emit for the Project by at least hundreds to thousands of pounds per day of VOCs, SOx, CO, NOx, and PM2.5/10. Toxic Air Contaminants from flaring also needs to be assessed. The HRA (Health Risk Assessment) should also be re-calculated for impacts of the full Potential to Emit of Flares.

**B. Heater and Boiler use was greatly expanded, but found in some cases to decrease in emissions, without a clear basis, sometimes leaving out best technology assessment**

Oil refinery heaters and boilers are very large, driving forces in refinery processes, are major users of energy (fossil fuels), and major sources of emissions. These include NOx, SOx, PM10, CO, VOCs, CO2, toxics, etc. It is important that modifications be fully evaluated for potential emissions increases with clear documentation, and strict consideration of requirements for application of BACT or BARCT (Best Available Control or Retrofit Control Technology).

G1-81.79

**1. The DEIR shows extensive increased use of heaters, boilers, and incinerators**

The Project includes extensive modifications on over a dozen existing heaters, boilers and incinerators, including increasing maximum permit limits.<sup>104</sup>

G1-81.80

<sup>103</sup> For example, Draft Title V at 188<sup>th</sup> p. of pdf.

<sup>104</sup> DEIR for example, Appendix B-3, Operational Emissions, at pp. B-3-5 to B-3-6

Table 8: Extensive Project Heater Modifications

Shutdown	<u>Wilmington FCCU:</u> •CO Boiler, •H2 Heater, •H3 Heater, •H4 Heater, •H5 Heater, •Startup Heater
Construction of New Heaters	For new Sulfuric Acid Regeneration Plant
Increased Maximum Permitted Firing Rates	<u>Carson</u> •51 Vacuum Unit Heater, <u>Wilmington</u> Heaters •H-100, •H-300, •H-301, (H-100 used in examples below)
Increased Utilization	<u>Carson Heaters:</u> •Light Hydrotreating Unit Heater, •FCCU Pre-Heater, <u>Wilmington Heaters:</u> •Delayed Coker Unit H-101, Hydrotreater Unit #3 •H-30, •H-21/22, Catalytic Reforming Unit •H-510, •H-501A, •H-501B, •H-502, •H-503/504 <u>Wilmington Boilers:</u> Steam Generating Boilers •7, •8, •9 and •10, Sulfur Recovery Plant Boilers •H-1601/1602 <u>Incinerators:</u> Sulfur Recovery Plant •F-704 and •F-754.
Modification	<u>Carson</u> •Naphtha Hydrotreater Heater

G1-81.80  
cont'd.

The DEIR list above states that there will be new construction, increased firing rates, and increased use of heaters, as well as modifications to one heater and shutdown of the Wilmington FCCU heaters.

**2. The DEIR includes contradictions, stating certain heater use will increase, but emissions will not, and therefore Best Available Control Technology is not required**

The DEIR finds that some modifications are for the purpose of standardizing the *form* of the permit limits. In the example of the Delayed Coker Unit (DCU) H-100 Heater, the limits would increase from 252 to 302.4 mmBtu/hr of heat input (a measure of the fuel used in the heaters, in million British Thermal Units per hour), and change from a “design heat release” basis, to “maximum heat release” basis, according to the DEIR, which is stated as an industry standard.<sup>105</sup>

G1-81.81

<sup>105</sup> DEIR at p. 4-2: “. . . The description will be changed from the ‘design heat release’ basis (252 mmBtu/hr) to the industry standard ‘maximum heat release’ basis (302.4 mmBtu/hr). This revision of the permit description does not involve any physical modifications, but would increase use of the heater which will enable more efficient production of gas oil and distillates from the feed to the DCU. Although the described duty of the heater will increase to 302.4 mmBtu/hr, there will be no increase in peak daily emissions as permit conditions will be imposed to limit criteria pollutant emissions. Mass emissions of NOx, SOx, PM10, CO and VOC will be restricted in the revised permit.” Emphasis added.



**However, the DEIR also states that these new limits will allow for increased use of certain heaters, so this is not just a change in format.** Since these heaters are undergoing *no physical changes* or improvements to reduce emissions, it is hard to imagine how heater *use* could be increased (which requires burning more fuels), without *increasing emissions*, even with new permit conditions, unless something else is changing. If the permit limits do not preclude increased heater use, then they cannot preclude increased emissions unless the heater is being improved. Emissions increases cannot be defined away by a statement that they will stay the same.

If the purpose is only to convert the measurement units to a different form—an industry-standard description of heat input limits that was otherwise equivalent—then there should be no resultant increase in heater *use* as a result of this change. Conversely, any new permit limits that still allow increased heater use, must mean increased fuel use is allowed, and this inherently means increased emissions.

The DEIR Appendix B-3 Heater calculations also state that emissions of Heater H-100 will not increase despite the District providing increased maximum firing rates. This appendix states that this conclusion is based on Tesoro’s belief that emissions can be kept down: *“Although Tesoro has requested an increase in equipment description maximum firing rate for this heater, Tesoro believes that it can maintain post-project heater emissions at or below the current maximum levels.”*<sup>106</sup> It also finds that BACT requirements (Best Available Control Technology for new or modified pollution sources) will not be triggered: *“As the modification will not result in an emissions increase, BACT is not triggered by this modification.”*<sup>107</sup>

G1-81.81  
cont’d.

The DEIR also finds the increased heater heat input, will allow increased crude oil throughput of 6,000 barrels per day at the refinery:

**This revision to the heater equipment description has the potential to increase the crude oil throughput to the Refinery by up to two percent (or up to 6,000 bbl/day).** The increased heat release from the H-100 heater and/or increased crude oil throughput is anticipated to occur once the modified permit is issued. Therefore, the draft environment impact report (DEIR) evaluated the impacts from the increase in crude throughput of up to 6,000 bbl/day.<sup>108</sup>

It is not possible to increase use of a heater *without* causing more emissions, unless the heater performance is improved in some way. **Since no improvements are identified, and physical changes are ruled out, then the emissions must increase.** The DEIR needs to explain this discrepancy.

<sup>106</sup> At p. B-3-9

<sup>107</sup> *Id.*

<sup>108</sup> Draft Title V modification, 274<sup>th</sup> page of pdf

The AQMD appeared to at least initially agreed to the obvious implication that an increase in maximum heat rating equated to increased emissions. An email from the AQMD included in an application for the Project stated: *“The proposed increases in the heat input ratings will be considered modifications to the heaters which will have potential for emissions increases.”*<sup>109</sup>

Section 2.7.2.1: The EIR states that the *“correction of the described duty”* for Heater H-100 serving the Delayed Coking Unit at LAR – Wilmington Operations (maximum firing rate increase from 252 MMBtu/hr to 302.4 MMBtu/hr), will result in an increase in crude oil processing capacity of 6,000 bbl/day. However, the proposed increase in permitted heat input rating for the No. 51 Vacuum Distillation Unit feed heater (D63) at LAR – Carson Operations (maximum firing rate increase from 300 MMBtu/hr to 360 MMBtu/hr) does not have potential to increase the crude oil processing capacity. Since the Delayed Coking Unit is a process unit further downstream than the Vacuum Distillation Unit, why will the permit modification for the No. 51 Vacuum Distillation Unit heater (D63) not have an associated increase in crude oil processing capacity?? The proposed increases in the heat input ratings will be considered modifications to the heaters which will have potential for emissions increases.

G1-81.82

(It is also interesting to note the District identified a concern that the No. 51 Vacuum Distillation Unit heater would have a similar potential for increased crude oil throughput. The DEIR should answer the question that was put here.)

It is even stranger that the DEIR finds there would be a sizeable *reduction* in NOx with this *increased* heater use, and also reductions of CO, PM10, and VOCs, but an *increase* in CO2E.<sup>110</sup>

Table 9: DEIR daily and annual DCU heater emissions changes

Wilmington DCU H-100 Heater Duty Bump (b)	NOx	SOx	CO	PM10	VOC	CO2E
Lbs/day	-171.03	86.69	-5.14	-0.98	-0.43	201,024.40
Tons/year	-4.38	35.38	3.63	0.75	0.80	36,686.95

G1-81.83

An additional note from DEIR Chapter 4 p. 4-17: (b) Negative numbers represent emission reductions as a result of permit limits imposed, which will reduce emissions to less than historically achieved.

There are additional inconsistencies in the DEIR results:

- **In the table above, some pollutants show reductions, others show increases, even though they are co-pollutants emitted at the same time by combustion from the same heater:** The DEIR should identify why CO2 shows consistently *higher* emissions (positive numbers) at both the daily and annual emissions rate, but the other combustion emissions (except for SOx) show negative numbers (*lower* numbers). CO2 increases are consistent

G1-81.84

<sup>109</sup> Email correspondence attached to Application from Tesoro to the AQMD. This application (A/N567645) was part of the set of applications listed as the relevant applications on the first page of the Draft Title V revisions, and was provided to CBE and the public 4/8/16 by Danny Luong, AQMD. See 901<sup>st</sup> page of pdf for email from Rafik Bashai, (AQMD), June 2015, to Cynthia Carter (Tesoro), Comments Regarding the Draft EIR for the Tesoro Refining Integration and Compliance Project.

<sup>110</sup> From Appendix B-3 Table A-1

with the heater’s increased use, as described in the DEIR, but the pollutants with lowered emissions are not.

G1-81.84  
cont’d.

- CO2 is shown with a steady emission rate from day to day over the year, but the other co-pollutants don’t show this:** Except in the case of CO2, the tons per year numbers don’t add up to the pounds per day multiplied by 365 days per year (and converted to tons). This is an inconsistency, because all these emissions are combustion by-products emitted by the heater at the same time due to burning hydrocarbon fuel, so if CO2E is emitted at the same rate, every day of the year, then the heater must be running at the same rate for the whole year, and the other pollutants should be emitted at the same rate for the entire year. Why then do the other pollutants’ daily emission rates not apply to the whole year, as CO2E does?<sup>111</sup> The DEIR needs to explain this, especially the future emissions are based on emissions factor estimates.

G1-81.85

Tesoro’s application for the change to H-100 states that it normally operates 24/7, all year, indicating that the CO2 emissions assessment (using the same rate of operation every day all year long) is the actual operation of this heater, which indicates that the criteria pollutant increases estimations should also use the daily max every day for the year.<sup>112</sup>

**Operating Schedule**

See Section 4. During normal conditions, this equipment operates 24 hours per day, 7 days per week and 52 weeks per year.

- 3. If H-100 will perform much better without physical changes, this indicates it was performing poorly in the past, and credits should not be generated locking in such inflated emissions.**

If it is true that this heater will perform better in the future without physical changes, at the same time that it will be used more, this is a strong indication that the heater was operating unnecessarily poorly in the past, and generating excess emissions. The reason for the improved performance of the heater was not identified in the DEIR (nor was the baseline data for the heater’s past emissions provided). The reductions should be verified through publicly-available baseline data. If verified, it would still run counter to public health interests to reward poor past performance by allowing the generation of credits for tuning up the heater performance in some way. Generating credits for this will lock in the unnecessarily high past emissions by allowing another source to increase. The DEIR should evaluate these issues.

G1-81.86

- 4. The numerical basis for H-100 heater NOx emissions appears to have inconsistencies and an error, which would result in NOx emissions for the Project being significant**

The DEIR does briefly provide a basis for the daily and annual emissions, but it does not adequately

G1-81.87

<sup>111</sup> After converting to tons by dividing by 2000.

<sup>112</sup> Tesoro Application 567439, 7<sup>th</sup> page of pdf

document the validity of the basis, emissions factors vary for the same pollutant, and it seems to use a different approach for pre-and post-Project NOx calculations that may not fairly compare these two time periods.

For example, the appendix provided a calculated emission factor for NOx of 0.1214 lb/mmBTU.<sup>113</sup> If this same factor was applied to both the current and the proposed heat input limits (changing from 252 to 302.4 = + 50.4 mmBTU/hr), this would result in a NOx increase of 6 lbs/hr<sup>114</sup> or +147 lbs/day. This is a big contrast to the result ultimately used in the DEIR (-171.03 lb/day, or reduced NOx).

Elsewhere, the DEIR (Table A-3) gives the basis for -171.03 lb/day NOx (decrease) ultimately chosen:

352.47 lbs/day (listed as Pre-Project actual emissions)  
 minus **181.44 lbs/day** (Post-Project Routine emissions).  
 -171.03 lbs/day

The Post-Project emissions of **181.44 lbs/day** NOx were in turn based on another Emission Factor or EF (.03 lbs/mmBTU).<sup>115</sup> (This is a different NOx emission factor than elsewhere given in the DEIR of 0.1214 lbs/mmBTU, also from Appendix B-3).

G1-81.87  
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Even assuming .03 lbs/day is correct for Post-Project emissions, the calculation above appears to include an error, in use of the *Pre-Project* heat input rate of 252 mmBTU/hr in the Post-Project calculations.<sup>116</sup> We can also reproduce this simple calculation:

0.030 lb/mmBTU x 252 mmBTU/hr = 7.56 lbs/hr, x 24 hrs/day = **181.44 lbs/day**,

If the calculation instead used the Post-Project heat input limit of 302.4 mmBTU/hr for Post-Project emissions, this is the result:

**0.030 lb/mmBTU x 302.4 mmBTU/hr = 9.07lbs/hr, x 24 hrs/day =217.73 lbs/day,**  
 (36 lbs/day higher than the 181 lb/day Post-Project number used in the DEIR).

The DEIR should explain why it used a Pre-Project heat input for Post-Project emissions. Adding 36 lbs/ day to the total NOx emissions changes listed in DEIR Table 4-2-4 of 38 lbs/day, would result in 74 lbs/day increase in NOx, which is above the 55 lb/day significance threshold.

<sup>113</sup> From Appendix B-3, page B-3-48, for H-100

<sup>114</sup> 0.1214 lbs/mmBTU X 50.4mmBTU/hr = 6.12 lbs/hr, x 24 hrs/day = 146.8lbs/day

<sup>115</sup> Table A-2., Appendix B-3, p. B-3-48

<sup>116</sup> "NOx (Daily): Emissions based on R1109 EF of 0.03 lb/mmbtu and 252 mmbtu/hr (previous described firing rate)" (Table A-2., Appendix B-3, p. B-3-48).

**5. The DEIR also uses routine emissions, not including startup / shutdown emissions**

Startup / shutdown emissions seem to have been left out of the emissions for heaters. These emissions are significant, occur regularly, are part of refinery operation, and should be included in emissions estimates. If the total emissions including SSC NOx emissions will *increase* due to the Project (as the DEIR table below indicates), then the DEIR should be corrected to include startup / shutdown emissions for this, and all sources. *[Note to attorneys –including startup/shutdown emissions is I believe a legal requirement]*

As below, the DEIR<sup>117</sup> showed *increased* NOx emissions of 6.12 tons per year (tpy) for DCU Heater H-100, in the case where Startup, Shutdown, and Commissioning emissions were included with routine emissions (labeled “NOx (SSC)”), instead of the decrease of 4.38 tpy when SSC was not included:

**Table 10: DCU Heater H-100 Pre- and post-Project emissions**

	Pre Mod Actual Emissions (Lbs/Year)	Post Mod Emissions (Lbs/Year)	Increase (Tons/yr)	Pre-Mod Basis	Post-Mod Basis
NOx (SSC)	74,980.50	87,220.49	6.12	--	--
NOx (Routine)	74,980.50	66,225.60	(4.38)	RECLAIM Data	2014 Permit Application

The DEIR also did not provide the RECLAIM data, or the 2014 Permit Application that were the basis of the pre- and post-Project emissions, which should be added.

**C. There is a greater potential for pipeline spills and the DEIR should add evaluation**

The pipelines associated with this Project, and with related Tesoro Logistics projects are extensive and should receive special attention, especially given that this is a region where a major earthquake is overdue. (See the later section –“*Special attention is needed for earthquake and related fire risks . . .*”) Furthermore, this report discussed cleaning and degassing emissions in the above section on tanks, which were also identified as a significant source of emissions in pipelines, and needed assessment in the DEIR. In addition, oil refinery pipeline spills have already occurred in the local area, and Tesoro has had its own major pipeline spills in other locations.

In addition to identified pipelines, one pipeline previously identified in the 2014 Negative Declaration was no longer identified in the DEIR. The 2014 Negative Declaration included a large expansion of a pipeline from the Marine Terminal to the new Storage Tanks, as a change from 12 to 42 inches (over a 12-fold increase in volume – see Neg Dec comments, attached). Since the new storage tanks are still part of the 2016 proposal, and these tanks would still receive crude oil from marine vessels by pipeline, the potential expansion and status of this or other pipelines from the

<sup>117</sup> Appendix B-3, at p. B-3-50, Table A-4

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G1-81.89

marine terminal should have been identified in the 2016 DEIR. Such a large pipeline expansion, especially in an earthquake zone, has a strong potential to significantly increase impacts, including spills or leaks. Tesoro has already had a history of pipeline spills and violations.

The status of this pipeline as part of the Project was not readily identifiable in the DEIR, and may have already been carried out, despite the environmental review (the 2014 Negative Declaration) being retracted. The DEIR needs to clarify the status of the pipeline as either no longer planned, already constructed, or sized differently, and how it relates to the Project, including whether it has come under different ownership (such as Tesoro Logistics, which was spun-off from Tesoro). Regardless of ownership, any pipelines from marine terminals to the refinery and especially the new storage tanks or expanded storage tanks are part of the Project, but the DEIR did not explain what happened to the 42-inch pipeline plan, either in the Project or in cumulative impacts. Even if the pipeline would go to existing storage tanks, the DEIR still needs to provide the status of the potential expansion, since the new storage tanks free up capacity in existing storage tanks, so effectively all the refinery storage tanks are impacted by the Project.

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The DEIR does identify an expansion from 12 to 24 inches (making volume four times larger) within the Wilmington operations, and states that there would be no changes at the marine terminal, but this is inconsistent with a down-stream pipeline expansion, but no up-stream expansion:<sup>118</sup>

Piping within the Carson Crude Terminal will be installed to connect the six new 500,000 barrel tanks to existing pipelines to the Carson Operations and Marine Terminal 1. The two new 300,000 barrel tanks will be connected to existing pipelines from the Wilmington Long Beach Terminal. Within the confines of the Wilmington Operations, the existing 12-inch diameter piping will be replaced with 24-inch diameter piping to connect the replacement tanks to the Wilmington Operations. . . .

Crude oil for the Wilmington Operations is delivered via ship using the pipeline from the Tesoro Marine Terminal at the Port of Long Beach. . . .

Currently Carson and Wilmington Operations are connected via Tesoro and third party pipelines that enable the transfer of intermediate and finished products between the two facilities. The proposed project is not expected to result in any physical changes to the existing marine terminals. Additionally, no changes to the pipelines connecting the marine terminal to the Refinery are planned as a result of the proposed project.

G1-81.90

This seems incongruous. The original project determined that it needed a 42-inch pipeline to offload to the new and expanded storage tanks, but the DEIR only identifies a portion of the pipeline within the refinery that will be expanded to 24, instead of 42 inches, then the rest of the pipeline volume upstream needs to be identified. It would be nonsensical to expand a down-line pipeline to 24 inches, while the up-line portion remains at 12 inches, so it is clear that the up-line pipeline either will be, or has been expanded to a larger pipeline, or that the down-line pipelines at the refinery would be connected to a larger number of up-stream pipes, or some such variation.

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<sup>118</sup> DEIR at p. 1-8 to 1-9

Either way, upstream pipelines are part of the Project or at least need cumulative impacts explored.

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**Pipeline impacts are not theoretical – Tesoro already had major spills and was identified for pipeline safety violations; other industry pipelines have ruptured in the Los Angeles region:**

- In N. Dakota, Tesoro was responsible for a major oil spill still being cleaned up.<sup>119</sup>
- Tesoro received a notice letter for potential pipeline safety violations in 2009, from the Pipeline and Hazardous Materials Safety Administration (PHMSA), attached.<sup>120</sup>



Tesoro N. Dakota pipeline oil spill site in wheat field

- Phillips 66 also had an oil pipeline rupture in a Wilmington California residential neighborhood (pictured below), causing severe odors, and prompting a visit and comments by Rep. Janice Hahn, D-San Pedro, who visited the site out of “concern for the safety and well-being of the residents of Wilmington,” . . . “The harsh, crude oil smell is not only horrible, but can also be potentially harmful to the neighborhood residents and environment.”

“As a member of the House Transportation and Infrastructure Subcommittee on Railroads, Pipelines and Hazardous Materials, I plan to make this oil spill incident a priority,” . . . “I have already reached out to the subcommittee to find out what federal actions we can take to ensure that an incident like this will not happen again, and that there is proper oversight with our nation’s pipelines.” . . . “We have to protect the residents of Wilmington and the environment from the risks of hazardous materials transportation.”<sup>121</sup>

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Phillips 66 2014 Wilmington neighborhood oil spill from Press-Telegram

<sup>119</sup> ‘It Will Never Be The Same’: North Dakota’s 840,000-Gallon Oil Spill, One Year Later, Emily Atkin, Climate Progress, Oct 21, 2014, <http://thinkprogress.org/climate/2014/10/21/3582480/north-dakota-spill-one-year-later/> and Two years after North Dakota oil spill, dirty pile still dwarfs clean pile, Amy Dalrymple / Forum News Service, Sep 26, 2015, <http://www.inforum.com/news/3848193-two-years-after-north-dakota-oil-spill-dirty-pile-still-dwarfs-clean-pile> Attachment 41 and 42

<sup>120</sup> Notice of Probably Violation and Proposed Compliance Order, CPF 5-2009-0002, January 6, 2009, U.S. Department of Transportation letter to Tesoro, Michael McCann, Vice President of Pipeline and Terminals, Tesoro Refining and Marketing Company, Attachment 43 [https://primis.phmsa.dot.gov/comm/reports/enforce/documents/520090002/520090002\\_NOPV%20PCO\\_01062009\\_text.pdf](https://primis.phmsa.dot.gov/comm/reports/enforce/documents/520090002/520090002_NOPV%20PCO_01062009_text.pdf)

<sup>121</sup> Crack in idle Phillips 66 pipeline spews crude oil onto Wilmington streets, Press-Telegram from Sandy Mazza, Daily Breeze, 03/18/14, <http://www.presstelegram.com/general-news/20140318/crack-in-idle-phillips-66-pipeline-spews-crude-oil-onto-wilmington-streets> Attachment 44

The DEIR needs to more fully examine existing underground pipeline threats in the area, increased threats from the Project, and cumulative impacts from Projects in the region.

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**D. California approved the Tesoro purchase of BP Carson despite anti-competitive concerns based on environmental improvements, so the Project should not take credit for the FCCU shutdown**

Tesoro was allowed by the Federal Trade Commission and State of California to buy the BP<sup>122</sup> Carson refinery next door to the Tesoro Wilmington refinery in 2013, despite outcries this would be ant-competitive and could increase gasoline prices. Consumer Watchdog found previous to the purchase, that there was already too much concentration of the gasoline market with too few oil companies in California, already causing high gas prices, so the organization opposed the sale as further exacerbating the problem.

Consumer Watchdog found the Tesoro purchase of the BP refinery was a bad deal for consumers, and could increase gas prices!<sup>123</sup>

**As Gas Prices Spike to Record High, Consumer Watchdog Urges California Attorney General to Block Tesoro Purchase of BP Refinery and Arco Gas Stations**

*Otherwise consumers will face even higher prices when Tesoro and Chevron control nearly half of California's fuel refining capacity*

"If the purchase goes through, Tesoro and Chevron will between them own more than half of California's fuel refining capacity, including the three largest refineries in the state," the letter said. "California's drivers and the state economy will pay the price for this merger at the pump. We ask you to halt it on antitrust grounds."

G1-81.92

The purchase means Tesoro and Chevron own half the refining capacity in the state, which is monopolistic. Usually when an oil company buys a refinery in the state they are required to sell another one, to avoid having a small number of companies monopolize the gas market, but Tesoro got away with the purchase without having to sell another refinery. Now Tesoro owns three refineries in the state, and four on the West Coast.

As a contrasting example, in 2001 the Federal Trade Commission investigated the merger of Valero and Ultramar, filed a complaint against them, and required that the merged companies sell one of the California refineries, in order to increase competition, since both already competed in the Northern California market.<sup>124</sup>

Resolving Anticompetitive Concerns,  
FTC Consent Order Would Allow Merger of Valero Energy and Ultramar,

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<sup>122</sup> British Petroleum

<sup>123</sup> <http://www.consumerwatchdog.org/newsrelease/gas-prices-spike-record-high-consumer-watchdog-urges-california-attorney-general-block-t>

<sup>124</sup> Federal Trade Commission, December 18, 2001, <https://www.ftc.gov/news-events/press-releases/2001/12/resolving-anticompetitive-concerns-ftc-consent-order-would-allow>



**Valero Required to Divest Golden Eagle Refinery and 70 Ultramar-owned Gasoline Stations**

Apparently the atmosphere had become more lax in 2013, because unlike Valero, Tesoro was allowed to proceed without selling a refinery. **The State of California did however identify environmental upgrades as conditions in its approval letter (below).**

Tesoro should not be eligible to generate air pollution credits to offset other air pollution expansions for these environmental improvements that were required for the merger, because they had to do that to get the state approval.

**Tesoro is specifically taking credit for pollution cuts from the planned shutdown of the Wilmington Fluid Catalytic Cracking Unit (FCCU)** and associated equipment, but the FCCU shutdown is referenced in the letter from the California’s Attorney General, as part of the decision to approve the BP refinery purchase.<sup>125</sup>

Tesoro should not be allowed to take credit for the cuts that were discussed in the Kamala Harris letter, since they were part of the deal that allowed Tesoro to buy into a much larger part of California’s fuels market. The following table shows that Project emissions without allowing credit for the FCCU shutdown are high:

Consumer Watchdog also found in 2016 that:<sup>126</sup>

In addition, Court pointed out that [the] Exxon increased its gasoline sales by 4% in 2015 despite the fact that its only refinery in Torrance was out for 11 months of the year. Exxon did this through production agreements with its competitors to use their refineries, including Tesoro, that signaled to the other refiners that Torrance would not be online for a long period of time. Meanwhile misinformation about Torrance led the market to believe that the refinery would be back online throughout the year, because Exxon had no duty to report its actual condition or true estimated uptime, sparking shortages and price spikes. [sic]

**Table 11: Project emissions without credit for the Wilmington FCCU shutdown**

NEW AND MODIFIED SOURCES	NOx	SOx	CO	PM10*	VOC	Notes
Total Combined Project Emissions as described in the DEIR (Negatives numbers mean reductions)	-567.98	-248.15	-599.06	-66.43	399.26	From App B-3 p.B-3-14
The above includes the following Total FCCU shutdown w Heaters & Fugitives Emissions	-572.59	-416.38	-959.79	-171.35	-318.96	App B-3, p B-3-14
<b>Total Project emissions without allowing credit for the FCCU Shutdown.</b>	<b>4.61</b>	<b>168.23</b>	<b>360.73</b>	<b>104.92</b>	<b>718.22</b>	

<sup>125</sup> May 17, 2013, Attachment 45

[https://oag.ca.gov/system/files/attachments/press\\_releases/AG%20Letter%20to%20CEC%20\(Tesoro\).pdf](https://oag.ca.gov/system/files/attachments/press_releases/AG%20Letter%20to%20CEC%20(Tesoro).pdf)

<sup>126</sup> *Consumer Watchdog Calls For Sunlight On Big Oil Refiners To Avert CA Gasoline Price Spikes; State Energy Commission Panel To Make Recommendations On Transparency For Refiners*, 4/22/2016,

<http://www.consumerwatchdog.org/newsrelease/consumer-watchdog-calls-sunlight-big-oil-refiners-avert-ca-gasoline-price-spikes-state-e> Attachment 46

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cont'd.

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Furthermore, the Draft Title evaluation found that the heaters associated with the Wilmington FCCU were never permitted under the District New Source Review (NSR) program. For this reason, the facility operated for decades without such NSR, Best Available Control Technology in place.<sup>127</sup> Tesoro should not receive emissions credits for shutting down the FCCU and associated heaters and other equipment, given the long term, higher-than-necessary emissions. The shutdown should be considered a result of the agreement with the state and Tesoro's modernization.

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cont'd.

**E. Special attention is needed for earthquake and related fire risks from the Project because of the large new storage tanks, pipeline expansions, LPG by rail, and increased risk of hazardous chemical release**

It is well established that Southern California is due for a major earthquake. A news report quoting USGS and emergency services experts summarized the risks well, finding an almost 100% chance of a big earthquake within 30 years, and that Southern California had a higher risk within the state. The damage would be severe with a higher magnitude quake, including collapses and fires:

**How bad would it be?<sup>128</sup>**

"You would see buildings collapse, you'd see people trapped, you'd see roadways collapse," said Kelly Huston of California's Office of Emergency Services. "You'd see widespread destruction." Under the USGS's crisis scenario for a magnitude-7.8 temblor in Southern California, the soil-filled Los Angeles Basin would turn into a violently trembling Jell-O, causing major highways and airport runways to buckle, water and sewer pipes to crack, electrical and gas lines to sever, and thousands of fires to break out across the region. Those blazes could then be whipped into a frenzy by the Santa Ana winds. Fiber-optic cables running across the San Andreas would be torn apart, and infrastructure would take months, if not years, to repair. The hospitals would be swamped by 50,000 injured people, and at least 1,800 would die.

G1-81.94

A research geologist stated the southern San Andreas has not had a large quake for more than a century. "That means stress is building, building, building," said Rufus Catchings, a research geophysicist. "It's overdue for a really big one."

This is well known, but unfortunately preparation does not always take a front seat. In the case of the DEIR, when a whole tank farm is being constructed with long pipelines, earthquake and fire risk should receive special attention – it merits a particular analysis. Building codes are designed to reduce seismic risks, not to eliminate them.

<sup>127</sup> Draft Title V calculations, 169<sup>th</sup> p. of pdf, [*However, the heaters associated with the FCCU (H-2 Heater (D92), H-3 Heater (D89), H-4 Heater (D90), H-5 Heater (D91), FCCU Startup Heater (D1664), and CO Boiler (D112)), were never permitted under the District NSR program. For this equipment emissions reductions are calculated as actual emissions over the past two years, reduced to the amount which would be actual if current Best Available Control Technology (BACT) were applied. Attachment #1 contains the calculations for emissions reductions from the heaters, based on current BACT emissions factors.*] ]

<sup>128</sup> *When will the Big One strike California?* The Week, April 19, 2014, <http://theweek.com/articles/447730/when-big-strike-california>

My previously cited 2014 comments on the ND included a discussion of the probability of an earthquake in the region, and potential impacts, such as fire damage to storage tanks (like the storage tank damage due to the Turkish earthquake shown below).

*Fire damage to naphtha tanks at Tüpräs refinery.*



G1-81.94  
cont'd.

Earthquake risk and prevention measures, including analysis regarding fires, toxic releases, and evacuation planning is essential when further increasing the concentration of flammable and explosive petroleum products, and additional hazardous materials, in an already-heavy industrial zone. Now is the time to do the planning, before a disaster occurs. I am unable to complete further comments on this extensive but key subject, but additional comments on fires and other hazards were identified in previously cited 2014 Fox report on the 2014 Negative Declaration. The broad and severe implications of earthquake and fire hazard should have its own separate analysis.

**VI. Cumulative Impacts should not have included the SCIG, are Significant, and many Interrelated Projects should be identified and evaluated**

**A. The Cumulative Impacts are significant and need to be corrected; an incorrect assumption claims reductions for the SCIG project, but its EIR has been invalidated in court**

The Cumulative Impacts section finds no cumulative operational impacts. Unfortunately, this conclusion is based mainly on the false assumption that one project will result in a large reduction in emissions. It showed the Southern California International Gateway project (SCIG) reduced emissions of 5,619 lbs/day NOx (or 2.8 tons per day or tpd), 2,905 lbs/day CO (about 1.5 tpd), 316 lbs/day VOCs, 139 lbs/day SOx, 313 lbs/day PM10, and 228 lbs/day PM2.5:

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**TABLE 5.2-2**  
**Cumulative Operational Emissions**  
**(lbs/day)**

No.	Project	VOC	CO	NOx	SOx	PM10	PM2.5
4	Southern California International Gateway Project <sup>(a)</sup>	-316	-2,905	-5,619	-139	-313	-228
6	ILWU Local 13 Dispatch Hall <sup>(b)</sup>	19.9	--	26.9	--	16.9	1.5
8	Valero Cogen <sup>(c)</sup>	33.4	201.8	0	0	95.8	20.6
9	WesPac <sup>(d)</sup>	-27	-266	-40	<1	-33	-30
10	LAUSD Span K-8 School <sup>(e)</sup>	8.76	--	--	--	--	--
12	Warren E&P <sup>(f)</sup>	19.0	14.4	20.5	--	3.7	4.3
15	Sepulveda/Panama Project <sup>(g)</sup>	339.1	546.9	521.6	2.82	203.9	32.4
16	Shell Revitalization Project <sup>(h)</sup>	50.83	0	0	0	0	0
21	Phillips 66 Crude Oil Storage <sup>(i)</sup>	166.8	109.1	249.4	0.3	18.9	12.8
22	Shell Carson Facility E10 Project <sup>(j)</sup>	0	0	0	0	0	0
23	Carousel Tract <sup>(k)</sup>	30	200	50	0.48	32	9.1
32	CSULB Foundation Retail Project <sup>(l)</sup>	4.89	18.95	3.61	0.03	2.26	0.67
34	Tesoro LPG Recovery Unit	0.46	0	0	0	0	0
35	Tesoro Dehexanizer Unit	0.68	0	0	0	0	0
40	Tesoro Storage Tank 956	0.15	0	0	0	0	0

(a) POLA, 2013 (As reported in FEIR, but subject to revision pending outcome of ongoing litigation.) (P. 5-18)

This is a surprising inclusion in the DEIR, because the AQMD challenged the validity of the SCIG EIR in court and won, and the court put the SCIG EIR aside. Regarding the SCIG and this victory, the AQMD website quoted William A. Burke, Chair of the AQMD Board:<sup>129</sup> *“Communities in the surrounding areas are already highly impacted by air pollution from the ports and other activities,”* and *“The impact this project would have on the residents, school children and others in the area is just unacceptable,”* The AQMD found that the SCIG would actually cause significant negative impacts on air quality:

The Port’s EIR acknowledged SCIG would have significant air quality impacts on nearby environmental justice communities, including the residences, parks, schools, and a homeless veteran’s shelter located in nearby West Long Beach. The SCAQMD argued that the air quality impacts would be worse than what was disclosed in the EIR and sought inclusion of enforceable mitigation measures to require cleaner trucks and trains as they become available.

In the court’s detailed 200-page opinion, Judge Goode ruled that portions of the EIR’s air quality analysis did not disclose the true extent of the project’s harm to air quality, and that important air quality mitigations were not enforceable and “could leave outdated technology locked into a major project for half a century.” The court further ruled that the EIR mischaracterized the project as providing an air quality benefit because it ignored the combined impacts of SCIG together with the proposed expansion of Union Pacific’s adjacent intermodal

<sup>129</sup> <http://www.aqmd.gov/home/library/public-information/2016-news-archives/scig-win-pr>

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container transfer facility railyard and BNSF’s existing Hobart railyard. The court also found serious deficiencies with the analysis of traffic and noise impacts.

This is a very damning finding and invalidates the use of the emissions reductions in the Tesoro Project Cumulative Impacts analysis.

Without the SCIG reductions, Table 5-2-2 emissions add up to: 646.97 lbs/day of VOCs, 825.15 lbs/day of CO, 832.01 lbs/day of NOx, 3.63 lbs/day of SOx, 340.46 of PM10, and 51.37 lbs/day of PM2.5:

**Table 12: Cumulative Operational Emissions (lbs/day) are significant with the SCIG subtracted**

	VOC	CO	NOx	SOx	PM10	PM2.5
6 ILWU Local 13 Dispatch Hall(b)	19.9	--	26.9	--	16.9	1.5
8 Valero Cogen(c)	33.4	201.8	0	0	95.8	20.6
9 WesPac(d)	-27	-266	-40	<1	-33	-30
10 LAUSD Span K-8 School(e)	8.76	--	--	--	--	--
12 Warren E&P(f)	19	14.4	20.5	--	3.7	4.3
15 Sepulveda/Panama Project(g)	339.1	546.9	521.6	2.82	203.9	32.4
16 Shell Revitalization Project(h)	50.83	0	0	0	0	0
21 Phillips 66 Crude Oil Storage(i)	166.8	109.1	249.4	0.3	18.9	12.8
22 Carson Facility E10 Project(j)	0	0	0	0	0	0
23 Carousel Tract(k)	30	200	50	0.48	32	9.1
32 CSULB Foundation Retail Project(l)	4.89	18.95	3.61	0.03	2.26	0.67
34 Tesoro LPG Recovery Unit	0.46	0	0	0	0	0
35 Tesoro Dehexanizer Unit	0.68	0	0	0	0	0
40 Tesoro Storage Tank 956	0.15	0	0	0	0	0
<b>Total</b>	<b>646.97</b>	<b>825.15</b>	<b>832.01</b>	<b>3.63</b>	<b>340.46</b>	<b>51.37</b>
<b>Operational Significance Thresholds</b>	55	550	55	150	150	55
<b>Significant?</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No	<b>Yes</b>	No

G1-81.95  
cont'd.

**This shows large, significant Cumulative Impacts for VOCs, CO, NOx, and PM10 for the Project, even given the small estimations of emissions given for the Tesoro Project**, without considering emissions underestimations discussed in other parts of this report. When additional underestimations discussed in this report are considered (such as SOx, PM2.5, and all pollutants from flares and heaters), then all criteria pollutants become significant.

**B. Many Interrelated Projects and additional issues should be identified and evaluated**

The Project is very complex, involving thousands of pages of permit applications, evaluations, and DEIR documents and appendices. While the AQMD provided much-appreciated extensions to the public comment period, there are still many areas of evaluation missing from the DEIR that I was unable to fully explore, but which have the potential for major impacts, or major cumulative impacts. The DEIR should provide information about these projects.

G1-81.96

Numerous related Projects or projects which could cause significant cumulative and/or piecemealed impacts that were not evaluated in the DEIR:

1. **Pipelines, storage, and export of fuels to Los Angeles International Airport – 16 miles of pipelines** were described in the Tesoro Logistic SEC 10K filing:
 

"On November 12, 2015, we purchased crude oil and refined product storage and pipeline assets in Los Angeles, California (the "LA Storage and Handling Assets") from Tesoro, which included 97 crude oil, feedstock, and refined product storage tanks with combined capacity of 6.6 million barrels and a 50% fee interest in a 16-mile pipeline that transports jet fuel from Tesoro's Los Angeles refinery to the Los Angeles International Airport."<sup>130</sup>

It appears that Tesoro terminal storage capacity is increasing significantly, and the DEIR should provide information about the cumulative impacts of this project for the region, and how the refinery project would provide fuels for the airport. (A different airport project was identified in cumulative impacts – the WesPac project, at p. 5-9)
2. **Additional modifications and/or inter-relation with Tesoro Logistics operations** (since Tesoro sold many facilities for gathering, moving, storing, and distributing petroleum inputs and products to Tesoro Logistics and since previously cited company literature identifies its ongoing plans to use synergies between Tesoro refining and Tesoro Logistics).
3. **Baselines and changes in sales of hydrogen from offsite companies such as Air Products (and any others) to the Tesoro refinery should be provided, to establish whether overall hydrogen use will increase.** Hydrogen used at oil refineries is generated using fossil fuels. The DEIR identifies many expanding areas where hydrogen is used (hydrocracking, hydrotreating, etc.), but also stated that since the FCCU would shut down, hydrogen use would decrease. However, no baseline for hydrogen use was provided. Hydrogen production is a high-energy process, and a major industry in the State of California. US EPA found that refinery hydrogen plants produce almost 6% of refinery's GHG emissions.<sup>131</sup> Importing of hydrogen from Air Products and
4. **An evaluation of the San Pedro butane storage tanks relation to the Tesoro Los Angeles Refinery Project is needed.** It has been stated that oil refineries including Tesoro use butane from this San Pedro site. Since Tesoro is increasing use of LPG (Liquefied Petroleum Gas such propane, butane, etc.) that it will be importing by rail, the DEIR should also identify potential cumulative impacts regarding Tesoro storage or use of butane from the San Pedro tanks, and whether this will change post-Project. Potential impacts from explosion risk in San Pedro related to piping, using, and storing materials

G1-81.96  
cont'd.

<sup>130</sup> From Tesoro Logistics 2015 10-K, p. 8: <http://services.corporate-ir.net/SEC.Enhanced/SecCapsule.aspx?c=242247&fid=14232449>

<sup>131</sup> *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Petroleum Refining Industry*, Oct 2010, <https://www.epa.gov/sites/production/files/2015-12/documents/refineries.pdf>

must be evaluated. Potential explosion risk at this site could devastate the local residences and cover a wide area.

A hazard assessment was performed for this facility, showing very large blast zone maps extending miles away from the facility in the event of catastrophic releases, for example due to earthquake. This assessment found:<sup>132</sup>

In the event of unexpected release of butane from the Amerigas storage facility, a variety of accidental risks can occur, which include types of combustion (pool, flash, and jet fires) and types of overpressure explosions (overpressure in storage tank, BLEVE [Boiling Liquid Expanding Vapor Explosion], etc.). The worst case scenario of a large-scale release hazard is projected to occur during the night when population density of the nearest receptors is highest. Low wind velocity is considered, as this would cause a dense vapor cloud of evaporated butane to collect within the facility, producing a powerful blast wave upon ignition. The largest combustion incident is projected to occur, whereupon BLEVE will occur as the result of simultaneous tank failure due to catastrophic earthquake, creating an intense overpressure that would result in a large-scale explosion, projectile shrapnel, and fire radiation exposure.

This site has garnered widespread community concern and prompted public hearings regarding safety.<sup>133</sup> One community member, Janet Gunter, testified at the AQMD hearing about the Tesoro Project relation to the San Pedro butane tanks. She provided the following information by email:<sup>134</sup>

“Tesoro and Valero both have contracts with Plains/Rancho LPG [*formerly Amerigas*] to receive and send their butane by pipeline directly from those facilities. Apparently Valero taps into the Tesoro pipeline, which I am assuming comes from the Wilmington facility. During summer blend months, the excess butane is pushed to Rancho from Tesoro. Then during the Winter months, the needed butane to be blended back into the gasoline is returned to Tesoro, again via the pipeline. Because of the issue of liability, it is assumed that Tesoro has some kind of buy/sell agreement that waives them of liability in case of accident while being stored at Rancho. The Rancho LPG manager has stated publicly that this storage facility is an important part of the region's refining process due to the

G1-81.96  
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<sup>132</sup> *Quantitative Risk Analysis for Amerigas Butane Storage Facility, 2010, Prepared in Consideration of: Amerigas Propane L. P., 2110 North Gaffey Street San Pedro, CA 90731, Cornerstone Technologies, Inc., <http://nwsanpedro.org/wp-content/uploads/2012/10/RISK-ANALYSIS-ON-TANKS-PDF2.pdf>*

<sup>133</sup> 9/11/2014, Donna Littlejohn, Daily Breeze, *Critics not satisfied by assurances that Rancho LPG storage tanks in San Pedro meets all federal standards*,

<http://www.dailybreeze.com/business/20140911/critics-not-satisfied-by-assurances-that-rancho-lpg-storage-tanks-in-san-pedro-meets-all-federal-standards>, Attachment 47

<sup>134</sup> Email from Janet Gunter to Julia May, Senior Scientist, CBE, May 19, 2016, In a follow-up email, she reported that this information was as reported to her by Valero, PHMSA (Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation), and Janice Hahn, Rep. Janice Hahn, D-San Pedro

"inability" of these two refineries to store this excess butane on their own property. Congresswoman Hahn has acknowledged a number of times, that these facilities should be storing this butane on their own property."

CBE asked Tesoro representatives if Tesoro stores butane at the San Pedro tanks. Tesoro representatives stated that the refinery did not, but that Tesoro does sell LPG products at certain times of year to third parties in the area.<sup>135</sup>

The DEIR should identify whether any parties (Tesoro or third parties) store or use LPG products that end up in these tanks, how this is transported (pipeline or other), volumes, and how this might change due to the Project.

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cont'd.

**VII. The Environmental Justice setting and implications of all the above Project and Cumulative impacts require serious attention and compliance with AQMD and EPA policies**

This Project Setting is proposed in an area of extreme industrialization, and a textbook case of environmental inequity. The DEIR is remiss in leaving out an Environmental Justice analysis for the Project. I have left discussion of this issue late in the report, in order to illustrate the specific harms of the Project first, but the context of the existing setting must not be underplayed, as is clearly illustrated in just the few examples below. The DEIR needs to pay this serious, detailed attention, because the Project is not occurring in isolation.

If there was any doubt, in one example study, *Minding the Climate Gap*, academic researchers found that the BP Carson (now Tesoro Carson) and Tesoro Wilmington were both the top, and the second worst polluters in the entire state, in terms of "*Top 10 Facilities Polluting Disproportionately in Communities of Color*". Specifically, the report analyzed the highest "*Pollution Disparity Index for PM10 at 2.5 Miles Across All Major GHG-Emitting Facilities*".<sup>136</sup> The report also found half of the top ten list in the state was in the Wilmington/Carson area (all five of these are oil refineries), which impact Wilmington, Carson, Long Beach, and other communities:

G1-81.97

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<sup>135</sup> 6/1/2016 meeting of CBE and Tesoro by telephone and webex presentation of Tesoro LARIC project.

<sup>136</sup> *Minding the Climate Gap*, 2009, Manuel Pastor, Ph.D., Rachel Morello-Frosch, Ph.D., MPH, James Sadd, Ph.D., Justin Scoggins, M.S, UC Berkeley, and USC Program for Environmental and Regional Equity, P. 7, available at: [https://dornsife.usc.edu/assets/sites/242/docs/mindingthegap\\_executive\\_summary.pdf](https://dornsife.usc.edu/assets/sites/242/docs/mindingthegap_executive_summary.pdf), Attachment 48



**Minding the Climate Gap - Top 10 Facilities Polluting Disproportionately in Communities of Color (p. 7)**

Rank	Facility Name	City	Pollution Disparity Index
1	BP Carson Refinery	Carson	1.44
2	Tesoro Wilmington Refinery	Wilmington (Los Angeles)	1.01
3	Paramount Refinery	Paramount	0.62
4	ConocoPhillips Wilmington Refinery	Wilmington (Los Angeles)	0.52
5	ExxonMobil Torrance Refinery	Torrance	0.40
6	Chevron Richmond Refinery	Richmond	0.32
7	Malburg Generating Station (Vernon Power Plant)	Vernon	0.31
8	ConocoPhillips Carson Refinery	Carson	0.29
9	Valero Wilmington Refinery	Wilmington (Los Angeles)	0.24
10	California Portland Cement Company Colton Plant	Colton	0.16

Minding the Gap provided this photo of Tesoro Wilmington air impacts during a 2009 accident:



G1-81.97  
cont'd.

(p.3)

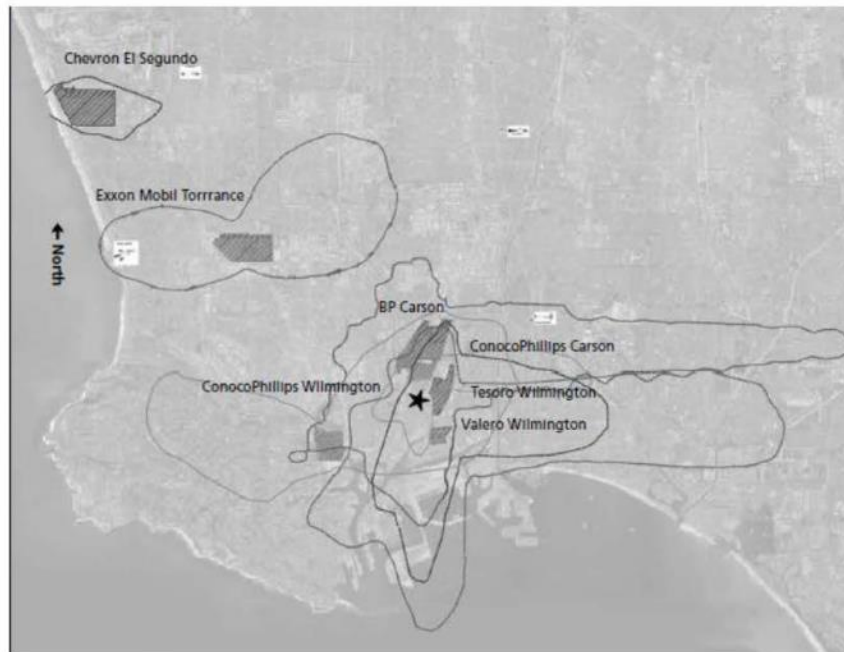
There is an abundance of information about the concentration of petroleum and other toxic sources in this area. I compiled information in 2009 into a report to the community regarding the concentration of refining in Southern California and the state, showing Wilmington/Carson/Long Beach,<sup>137</sup> as the highest concentration of oil refining in the state, with almost a third of the state's

<sup>137</sup> The Increasing Burden of Oil Refineries and Fossil Fuels in Wilmington, California and How to Clean them Up, April 2009, [“California has a large oil refining capacity—over 2 million barrels per day (bpd) of crude oil refined in three regions. The largest refining capacity in the state is in the Los Angeles region (about 1.25 million bpd of crude oil refining), followed by the San Francisco Bay Area with about 860,000 bpd refining capacity, with another 150,000 bpd in the Center of California). Even a single small refinery is a major air pollution source. (See maps on the following

capacity. (See for example, pages 3, 6, 14, and 15). The capacity of many individual refineries has probably increased since that time (possibly statewide), but the high concentration in Wilmington/Carson/Long Beach remains.

G1-81.97  
cont'd.

At that time, the AQMD provided a map of oil refinery plumes in the South Coast (below and available in the Wilmington report), showing the overlapping plumes of 5 oil refineries impacting Wilmington, Carson, Long Beach, and further areas downwind (at p. 6):



G1-81.98

I also summarized demographic data at the time for Wilmington showing this area is not only impacted by refineries, but two major ports, heavy, and expanding freeways, auto body shops, oil drilling, and more. It also showed that Wilmington is a community of color, and also a lower income area compared to the region.

pages.) • Wilmington/Carson in the LA region has the highest concentration of refineries in the state (about one third the state's capacity). About half Los Angeles' refining capacity is concentrated in the Wilmington/ Carson area (five refineries and about 650,000 bpd). "] at p. 3, [http://www.cbecal.org/wp-content/uploads/2012/05/wilmington\\_refineries\\_report.pdf](http://www.cbecal.org/wp-content/uploads/2012/05/wilmington_refineries_report.pdf)

**APPENDIX G: RESPONSE TO COMMENTS**

Five Oil Refineries	Oil Drilling
Ports of LA & Long Beach	Alameda Corridor (railway)
I-110 & 710 Freeways	Diesel Trucking
Auto Body Shops	Recycling Facilities
Sewage Treatment (& much more)	Regional Smog

**Communities of color & the low income in Wilmington bear the cumulative impact burden of fossil fuel.<sup>28</sup>**

	Wilmington	LA
Hispanic or Latino of any race	85%	45%
Median household income	\$30,260	\$42,190
Individuals below the poverty level	27%	18%

G1-81.98  
cont'd.

I did not provide this information for Carson and Long Beach at the time. The DEIR should provide an updated analysis on the local demographics.

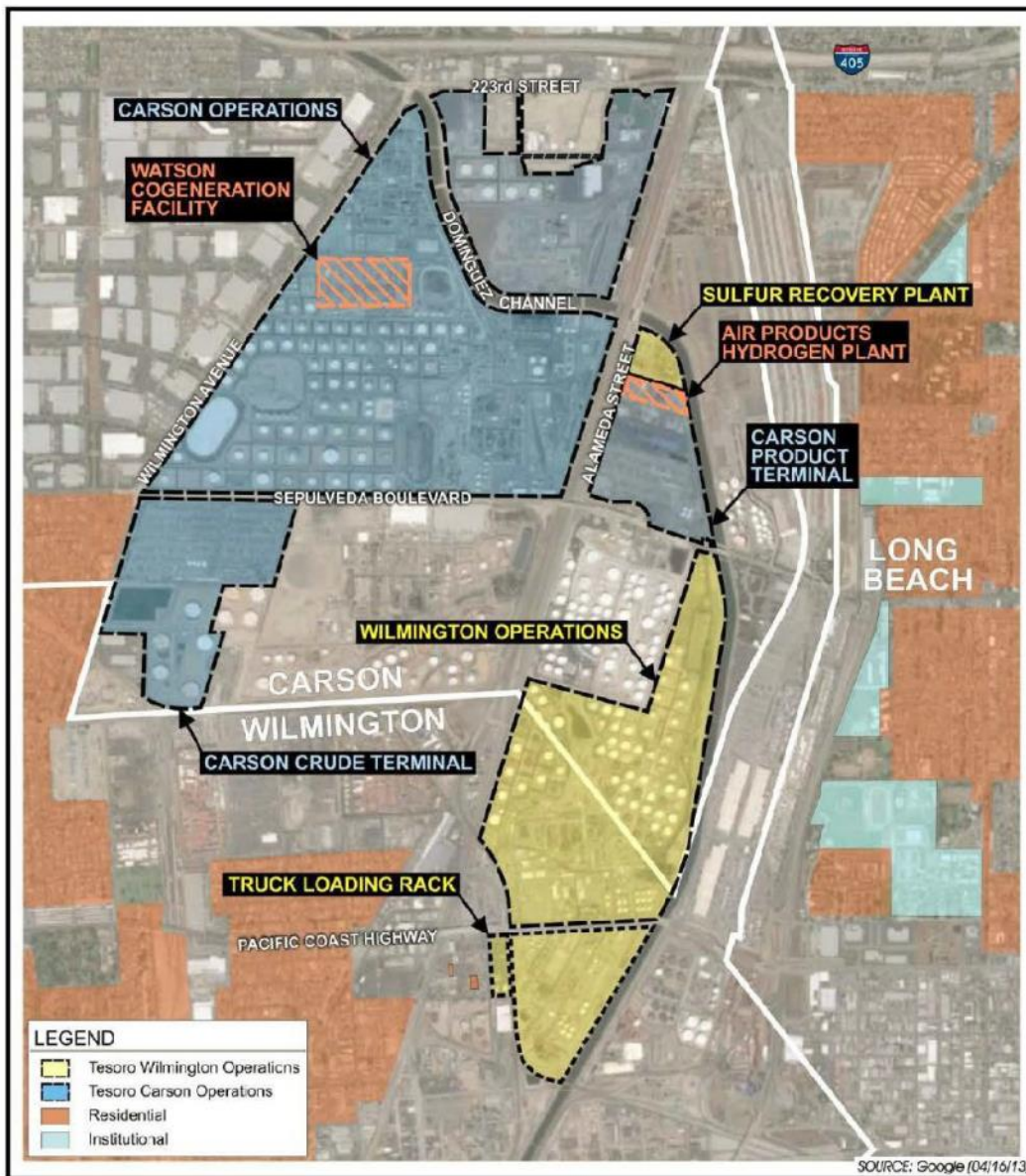
The DEIR did provide in the Cumulative Impacts chapter the following long list of many other major projects in the area (at p. 5-20):

**TABLE 5.2-3  
Cumulative Health Risk Assessment Results Associated with  
Exposure to Toxic Air Contaminant Emissions**

No.	Cumulative Project	MEIR	MEIW	Chronic Hazard Index	Acute Hazard Index
4	Southern California International Gateway Project <sup>(a)</sup>	-160 x 10 <sup>-6</sup>	-114 x 10 <sup>-6</sup>	0.11	0.13
6	ILWU Local 13 Dispatch Hall <sup>(b)</sup>	NS	NS	--	--
8	Valero Cogen <sup>(c)</sup>	0.57 x 10 <sup>-6</sup>	0.33 x 10 <sup>-6</sup>	0.024	0.019
12	Warren E&P <sup>(d)</sup>	0.4 x 10 <sup>-6</sup>	0.05 x 10 <sup>-6</sup>	0.0007	0.014
16	Shell Revitalization Project <sup>(e)</sup>	8.90 x 10 <sup>-6</sup>	7.20 x 10 <sup>-6</sup>	0.022	0.105
21	Phillips 66 Crude Oil Storage <sup>(f)</sup>	0.13 x 10 <sup>-6</sup>	0.13 x 10 <sup>-6</sup>	0.0005	0.0015
22	Shell Carson Facility E10 Project <sup>(g)</sup>	2.11 x 10 <sup>-6</sup>	1.55 x 10 <sup>-6</sup>	0.0196	0.002
23	Carousel Tract <sup>(h)</sup>	0.81 x 10 <sup>-6</sup>	0.09 x 10 <sup>-6</sup>	0.01	0.01
32	CSULB Foundation Retail Project <sup>(i)</sup>	0.16 x 10 <sup>-6</sup>		0.001	NA

G1-81.99

The DEIR did provide the following map, showing residences in close proximity, surrounding the two refineries, although a larger map would show additional impacted residences:



G1-81.99  
cont'd.

This community requires serious attention regarding air pollution and hazards. The communities of Wilmington, Carson, and Long Beach are proud communities, with a richness of culture and community strength, in addition to carrying this extreme burden of heavy industry. Providing an Environmental Justice analysis is consistent with AQMD and EPA policies, and should be part of the DEIR.

**VIII. Recommendations and Alternatives**

In order to evaluate the potential Project impacts, the DEIR should provide the baseline data and evaluations described above in this report. As a partial summary, it should include the following information:

**Baseline data and projected changes for the following:**

Crude Oil:

- The crude oil slate** baseline of each refinery for at least the past 5 years, including the specific crude oil geographic origin, API gravity, H2S percent and total sulfur percent, TAN, metal content, benzene percent, and paraffinic content, in addition to projected changes, for both domestic and imported crude oil; G1-81.100
- Total crude oil throughput** baseline data at each refinery for the past 5 years and projected changes, clarifying the discrepancy between the DEIR figures of 363,000, plus potentially 6,000 bbls/day, as compared to the Tesoro website figure of 380,000, and projected changes; and distillation unit throughput baseline and projected changes; G1-81.101
- The crude oil storage** baseline including total existing volume at each refinery, the total existing throughput, and the specific crude oils stored in each tank for at least the last year, in addition to projected changes. G1-81.102

Others:

- Sales of fuels within California**, outside California to other states, and outside the U.S., baseline and projected changes, and the percent of baseline and future projected fuels sales that already meet California low sulfur fuels standards, and what percent would instead meet federal Tier 3 standards; G1-81.103
- Desulfurization capacity**, baseline and projected changes; G1-81.104
- Mass of sulfur processed in each refinery** (baseline for the last 3-5 years, and projected changes); G1-81.105
- Emissions for DCU Heater H-100** and other project heaters, including criteria pollutants, toxics, and greenhouse gases baseline daily and annual emissions. G1-81.106
- Hydrogen purchase** baseline and projected changes. G1-81.107
- LPG, butane, propane** storage at San Pedro tanks and projected changes, and sales to third parties storing these materials; G1-81.108
- Marine terminals crude delivery characteristics, ship size and projected changes** G1-81.109

**The DEIR should evaluate the following:**

- A complete Environmental Justice evaluation of the human and environmental setting, and potential increased burden due to the additional impacts listed below G1-81.110
- The potential that additional crude oil storage tank volume, throughput, and permit limits accommodate different crude oils, especially Bakken and Canadian crudes. G1-81.111

**APPENDIX G: RESPONSE TO COMMENTS**

- The refinery’s potential to replace Alaskan crude with Bakken.
  - The potential for increased BTEX presence and other negative impacts in the refinery due to replacement of Alaskan crude with Bakken.
  - The refinery potential to mix Bakken and Canadian crude to approximate Alaskan crude.
  - The refinery potential to replace California crudes with Canadian tar sands crudes.
  - An evaluation of the well to wheel GHG and other emissions due to a substantial switch to Bakken crude oils above the baseline at the refinery.
  - An evaluation of the well to wheel GHG and other emissions due to introduction of significantly increased volumes above the baseline of Canadian crude oils at the refinery.
  - Potential increased corrosion, explosion risk, benzene, H2S, and other toxic components of crude oil, increased processing hazards due to paraffinic crudes, increased GHGs due to replacing some heavy crudes with heavier crudes including Canadian.
  - Potential impacts out of state due to importing Bakken crude oil to new Tesoro LA storage tanks, including GHGs and transportation risks.
  - The Project potential to increase to the total refinery crude oil throughput, distillation unit, coker throughput, and other unit increases, due to the current lack of clarity on the exact refinery capacity and actual baseline throughput.
  - The potential that additional desulfurization may accommodate additional Canadian crude oil.
  - The potential increase in the overall mass of H2S at the refinery due to additional desulfurization.
  - GHG emissions of third parties due to importing additional hydrogen to the refinery.
  - The potential for additional hazards at the San Pedro storage tanks, due to increased use of LPG at the refinery
  - Hazards due to spills and accidents from ships due to crude oil changes
  - Interconnection and cumulative impacts of the Tesoro LA refinery with other Tesoro facilities in the region that transfer petroleum materials, including Tesoro Logistics and others
  - The status of the 42-inch pipeline expansion from the marine terminal to the storage tanks, described in the Tesoro 2014 Negative Declaration
  - Identification of cumulative potential impacts from underground petroleum pipelines and storage tanks controlled by Tesoro and Tesoro Logistics, and the regional petroleum industry, in the event of earthquakes and related fires.
- Additional Alternatives to the Project pooling public recommendations on safety and lower emissions should be evaluated, including:**

G1-81.111  
cont’d.

G1-81.112

G1-81.113

G1-81.114

G1-81.115

G1-81.116

G1-81.117

G1-81.118

G1-81.119

G1-81.120

Because of extensive deficiencies in the DEIR, and the potential for significant harms due to the Project, an alternative outlined as follows should be added. Because the DEIR defines the objectives of the Project to be basically to build the units identified as the Project, it is not possible to propose an environmentally preferred alternative that meets the Project objectives. The DEIR has set up a self-supporting description in this way, so that only building the identified Project components can be found consistent with the objective of building the identified Project components (a circular argument).

This should be corrected, or as an alternative, the following could be considered as a hybrid between a No Project alternative, and an environmentally preferred alternative which meets some of the Project objectives (such as reducing emissions), but either way should be considered.

**This environmentally preferred alternative should be evaluated, including at least the following means to eliminate Project impacts:**

- No increased refinery crude oil throughput above an established, publicly available baseline (by permit),
- No storage tank expansions,
- No Bakken or Canadian crude oil in the refinery above baseline levels, set by a permit condition,
- No increased hazards and no increases in explosive and acutely hazardous materials use (including at least LPG sources, new railcar transfers, H<sub>2</sub>S, the Sulfuric Acid Regeneration Plant, Wet Jet Treater, and hydrotreaters),
- Additional emissions reductions in the refinery to offset or prevent potential increases from flaring, heaters, the crude oil switch, and all sources.
- Evaluation of funding for local zero carbon alternative energy mitigation measures, for example, those included in the 2014 Chevron Modernization Project Revised DEIR,

G1-81.120  
cont'd.

**On this last point, the Tesoro DEIR should evaluate the zero carbon mitigation measures identified in the 2014 Chevron Richmond Modernization Project Revised Draft Environmental (RDEIR).** Many examples were included in the 2014 Chevron Modernization Project Revised DEIR (RDEIR) after the initial Chevron DEIR was rejected by the court due to its failure to account for changes to the crude oil slate, and was then extensively re-written.<sup>138</sup>

Although the Chevron RDEIR still contained deficiencies outlined in public comment, it nevertheless identified a whole class of local alternative energy mitigation for air pollution increases (both GHGs and co-pollutants) that are not present in the Tesoro LARIC DEIR. This included a fair amount of good information on innovative Community-Based Greenhouse Gas Reduction Programs (CGRPs), in line with ideas proposed by the community concerns that would move toward changing the local energy infrastructure toward inherently cleaner and safer systems is necessary. The RDEIR however was limited in its proposals to carry out the identified mitigation, and can be improved upon, but Chevron did identify millions of dollars in funding for developing

G1-81.121

<sup>138</sup> Chevron Richmond Refinery Proposed Revised Project City of Richmond Planning Department File PLN11, May 2, 2014, Full RDEIR through City of Richmond, CA, links to this RDEIR may no longer be current at the City of Richmond website; excerpts are provided as Attachment 49, and should be available by request at the City, or by request to CBE.

**APPENDIX G: RESPONSE TO COMMENTS**

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these zero carbon community programs. The Chevron RDEIR unfortunately stated that CGRP reductions were just examples, and if not carried out, they would be replaced with cap-and-trade allowances (which are not local, and not reliable reductions). An environmentally superior alternative project would provide firm, specific, local reduction commitments at higher levels while improving the local economy.

Attached are my comments on the Chevron RDEIR zero carbon refinery emission mitigation measures, which identifies many of these mitigation measures, references the full Chevron report, and identifies improvements to ensure implementation.<sup>139</sup>

G1-81.121  
cont'd.

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My CV is attached.<sup>140</sup>

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<sup>139</sup> Comments on the Chevron RDEIR: A Feasible Alternative to the Project would provide firm, specific, local Greenhouse Gas Reductions, and this would be Environmentally Superior, Regarding the Chevron Richmond Refinery Proposed Revised Project, City of Richmond Planning Department File PLN11, May 2, 2014, Julia E May, CBE, which was attached to CBE comments on the Project, Attachment 50

<sup>140</sup> Attachment 55



## APPENDIX G1: RESPONSE TO COMMENTS

List of Attachments submitted with comments of Julia E May,  
CBE on Tesoro LARIC DEIR and Title V, 6/10/16

Name	Date modified	Type	Size
Attachment 1 tesoro-los-angeles-fact-sheet	6/10/2016 3:40 PM	Adobe Acrobat D...	176 KB
Attachment 2 TSO-Transcript-2015-12-09T14_00	5/19/2016 10:47 A...	Adobe Acrobat D...	319 KB
Attachment 3 TSO_MorganStanley2016_Pres2 05122016	6/10/2016 5:02 PM	Adobe Acrobat D...	1,826 KB
Attachment 4 Morningstar 07242013	6/10/2016 5:14 PM	Adobe Acrobat D...	31 KB
Attachment 5 Excerpt Tesoro Savage DEIS	6/10/2016 8:35 PM	Adobe Acrobat D...	204 KB
Attachment 6 2014 Simmons Energy v2	6/8/2016 12:32 PM	Adobe Acrobat D...	2,393 KB
Attachment 7 JMay CBE Comments Tesoro storage tank ND final	6/10/2014 3:33 PM	Adobe Acrobat D...	2,059 KB
Attachment 8 Tesoro Project quotes	6/10/2016 8:34 PM	Adobe Acrobat D...	490 KB
Attachment 9 DEIS Ch 0b Exec_Summary Tesoro Savage Vancouver term...	6/10/2016 6:12 PM	Adobe Acrobat D...	545 KB
Attachment 10 Tesoro Savage Vancouver WA 20151124_DEIS_FactSheet	6/10/2016 5:17 PM	Adobe Acrobat D...	68 KB
Attachment 11 S&P Global_ Tesoro cuts 2016 spending_ Janet McGurty _...	6/10/2016 5:22 PM	Adobe Acrobat D...	158 KB
Attachment 12 Vancouver Port Gives Oil Companies What They Want	6/10/2016 5:25 PM	Adobe Acrobat D...	102 KB
Attachment 13 Fox Comments Tesoro Storage ND 2014	6/10/2016 4:05 PM	Adobe Acrobat D...	635 KB
Attachment 14 Tesoro 2015 Crude Oil Imports	6/6/2016 9:41 PM	Adobe Acrobat D...	308 KB
Attachment 15 and 16 Calcs for Tables 1 and Table 3 JMay Tesoro LARIC...	6/7/2016 11:40 AM	Adobe Acrobat D...	334 KB
Attachment 17 tesoro-los-angeles-fact-sheet	6/10/2016 5:29 PM	Adobe Acrobat D...	176 KB
Attachment 18 Excerpt from Tesoro SEC Report 2013	6/10/2016 5:32 PM	Adobe Acrobat D...	163 KB
Attachment 19 BP agrees to sell Carson refinery to Tesoro	6/10/2016 5:34 PM	Adobe Acrobat D...	143 KB
Attachment 20 North_American_Crude_Boom-platt-2013	6/10/2016 5:35 PM	Adobe Acrobat D...	3,863 KB

Name	Date modified	Type	Size
Attachment 21 TSO_2014DBRefining_v1 Deutsche Bank Energy Conferen...	6/10/2016 5:37 PM	Adobe Acrobat D...	2,089 KB
Attachment 22 DOT 2014 Bakken Crude Rail_Safety_Alert	6/6/2016 10:38 PM	Adobe Acrobat D...	50 KB
Attachment 23 Innovative Solutions for Processing Shale Oils - Hydrocar...	6/10/2016 5:41 PM	Adobe Acrobat D...	420 KB
Attachment 24 DOT 2014 Bakken Crude Rail_Safety_Alert	6/10/2016 5:42 PM	Adobe Acrobat D...	45 KB
Attachment 25 New Spilled Crude Oil Discovered At Mosier Train Crash	6/7/2016 6:33 AM	Adobe Acrobat D...	286 KB
Attachment 26 Oil and Gas Journal Heavy Crudes and Distillation Unit pr...	6/10/2016 5:05 PM	Adobe Acrobat D...	507 KB
Attachment 27 Turner_2016-Geophysical_Research_Letters	6/10/2016 5:47 PM	Adobe Acrobat D...	1,292 KB
Attachment 28 Methane leaks	6/10/2016 5:50 PM	Adobe Acrobat D...	241 KB
Attachment 29 Tesoro eyeing Bakken pipeline storage bismarcktribune	6/10/2016 5:56 PM	Adobe Acrobat D...	103 KB
Attachment 30 Study Higher GHGs form Tar Sands crude	6/10/2016 7:05 PM	Adobe Acrobat D...	433 KB
Attachment 31 Flare Data R1118EVENTDATAFORM_2015Q1	6/5/2016 10:55 PM	Adobe Acrobat D...	51 KB
Attachment 32 Flare Data LAR_R1118_REPORT_4Q14_SCAQMD	6/5/2016 10:19 PM	Adobe Acrobat D...	125 KB
Attachment 33 Flare Data LAR_R1118_REPORT_1Q14_SCAQMD	6/5/2016 10:17 PM	Adobe Acrobat D...	54 KB
Attachment 34 2014-tesoro-refinery-carson-flare-data	6/10/2016 6:24 PM	Adobe Acrobat D...	71 KB
Attachment 36 Indust Flares - Linking Plume Dispers w Combust 2001 b...	6/7/2016 1:37 PM	Adobe Acrobat D...	706 KB
Attachment 37 Theoretical and observational assessments of flare effici...	6/10/2016 6:30 PM	Adobe Acrobat D...	72 KB
Attachment 38 Impacts Flare Efficiency Ozone Formation Houston	6/7/2016 1:30 PM	Adobe Acrobat D...	92 KB
Attachment 39 Process Diagram « John Zink Flare System	6/10/2016 6:31 PM	Adobe Acrobat D...	162 KB
Attachment 40 Emissions Protocol for Oil Refineries Excerpts	6/7/2016 1:04 PM	Adobe Acrobat D...	365 KB

## APPENDIX G1: RESPONSE TO COMMENTS

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 Attachment 41 North Dakota's 840,000-Gallon Oil Spill One Year Later	6/10/2016 6:33 PM	Adobe Acrobat D...	482 KB
 Attachment 42 Two years after North Dakota oil spill	6/10/2016 6:41 PM	Adobe Acrobat D...	340 KB
 Attachment 43 Notice of Probable Violation Tesoro	6/10/2016 6:43 PM	Adobe Acrobat D...	43 KB
 Attachment 44 Crack in idle Phillips 66 pipeline spews crude oil onto Wil...	5/31/2016 11:40 A...	Adobe Acrobat D...	120 KB
 Attachment 45 California AG Kamala Harris Letter to CEC (Tesoro BP pur...	5/15/2016 6:02 PM	Adobe Acrobat D...	1,384 KB
 Attachment 46 Consumer Watchdog Calls For Sunlight On Big Oil Refiners	6/4/2016 6:53 PM	Adobe Acrobat D...	280 KB
 Attachment 47 Critics not satisfied Rancho LPG storage tanks meets stan...	5/31/2016 2:51 PM	Adobe Acrobat D...	247 KB
 Attachment 48 mindingthegap_executive_summary	6/10/2016 6:48 PM	Adobe Acrobat D...	6,457 KB
 Attachment 49 EXCERPT CHEVRON RDEIR 2014	6/10/2016 8:16 PM	Adobe Acrobat D...	461 KB
 Attachment 50 JMay Comments on Chevron 2014 RDEIR	6/10/2016 9:29 AM	Adobe Acrobat D...	560 KB
 Attachment 51 Julia E May CV	6/10/2016 8:16 PM	Adobe Acrobat D...	171 KB



# LOS ANGELES REFINERY

## Fact Sheet

### Refinery Information

Tesoro's Los Angeles refinery is located in Los Angeles County, near the Los Angeles Harbor, on approximately 930 acres. The Los Angeles refinery is the largest refinery on the West Coast and is a major producer of clean fuels. At full capacity, it operates at 380,000 barrels per day (bpd). The refinery processes heavy crude from California's San Joaquin Valley and Los Angeles Basin as well as crudes from the Alaska North Slope, South America, West Africa and other international sources. It manufactures gasoline, jet fuel, diesel fuel, petroleum coke, fuel oil, fuel gases, propylene and calcined coke.

The Los Angeles refinery receives crude at its marine terminals in L.A. Harbor and ships products throughout southern California, Arizona and Nevada via its connections to several product distribution pipelines and terminals. It distributes all grades of gasoline and ultra-low-sulfur diesel, primarily to Tesoro's retail system under the ARCO®, Shell®, Exxon®, Mobil®, USA Gasoline™ and Tesoro® brands. Its Watson Cogeneration plant produces 400 MW, and is the largest cogeneration facility in California.

#### Fast Facts

- ◆ Los Angeles full-time employees: Approx. 1,450
- ◆ Crude oil capacity: 380,000 bpd

#### Environment

- ◆ Partners with Friends of Cabrillo Marine Aquarium.
- ◆ Participates in Sharefest Community Work Day.
- ◆ Partners with the Aquarium of the Pacific.
- ◆ Participates in electronic recycling events.
- ◆ First LEED (Leadership in Energy & Environmental Design) certified building in Carson.

#### Health and Safety

- ◆ Received the Meritorious Safety Performance Award from the American Fuel and Petrochemical Manufacturers (AFPM).

#### Community Support

- ◆ Sponsors United Way of Greater Los Angeles programs Success by Six and Read Across America.
- ◆ Sponsors and volunteer for Special Olympics Southern California year-round.
- ◆ Sponsors Friends of Banning Park.
- ◆ Sponsors the Youth and Government program at San Pedro/Wilmington YMCA.
- ◆ Partners with Los Alamitos Education Foundation.
- ◆ Provides summer youth and internship programs.

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 Carson, CA 90810  
 Community Hotline: (800) 377-2726

### Company Profile

Tesoro Corporation, a Fortune 100 company, is an independent refiner and marketer of petroleum products. Tesoro, through its subsidiaries, operates six refineries in the western United States with a combined capacity of over 875,000 barrels per day and ownership in a logistics business, which includes a 36% interest in Tesoro Logistics LP (NYSE: TLLP) and ownership of its general partner. Tesoro's retail-marketing system includes over 2,300 retail stations under the ARCO®, Shell®, Exxon®, Mobil®, USA Gasoline(TM) and Tesoro® brands.

THOMSON REUTERS STREETEVENTS

# EDITED TRANSCRIPT

TSO - Tesoro Corporation 2015 Analyst and Investor Day

EVENT DATE/TIME: DECEMBER 09, 2015 / 2:00PM GMT

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DECEMBER 09, 2015 / 2:00PM, TSO - Tesoro Corporation 2015 Analyst and Investor Day

### CORPORATE PARTICIPANTS

**Sam Ramraj** *Tesoro Corporation - VP IR*

**Greg Goff** *Tesoro Corporation - Chairman, President, CEO*

**Keith Casey** *Tesoro Corporation - EVP Operations*

**Phil Anderson** *Tesoro Corporation - President Tesoro Logistics GP, LLC*

**CJ Warner** *Tesoro Corporation - EVP Strategy & Business Development*

**Steven Sterin** *Tesoro Corporation - EVP, CFO*

### CONFERENCE CALL PARTICIPANTS

**Ryan Todd** *Deutsche Bank - Analyst*

**Doug Leggate** *BofA Merrill Lynch - Analyst*

**Phil Gresh** *JPMorgan - Analyst*

**Paul Sankey** *Wolfe Research - Analyst*

**Ed Westlake** *Credit Suisse - Analyst*

**Paul Cheng** *Barclays Capital - Analyst*

**Chi Chow** *Tudor, Pickering, Holt & Co. - Analyst*

**Evan Calio** *Morgan Stanley - Analyst*

**Jeff Dietert** *Simmons & Company - Analyst*

**Faisal Khan** *Citigroup - Analyst*

**Neil Mehta** *Goldman Sachs - Analyst*

**Bryan Zarahn** *Barclays Capital - Analyst*

**Brad Heffern** *RBC Capital Markets - Analyst*

**Andy Burd** *JPMorgan - Analyst*

### PRESENTATION

**Sam Ramraj** - *Tesoro Corporation - VP IR*

Good morning, everyone. I am Sam Ramraj, and along with my leadership team, we are delighted to be here and we welcome you to Tesoro Corporation's analyst and investor day.

I would like to remind you to turn your cell phones off or at least put them on a silent mode. Keep in mind in case of an emergency there are two emergency exits here, one to the front and one to the back of the room, so take a moment to know where the exits are. In case of evacuation, there will be a security officer on the floor who will give us directions on where to go and how to proceed.

For those of you listening to our webcast, the materials that we will be using today can be found on Tesoro and Tesoro Logistics websites.

Please note that management comments today will include forward-looking statements. Therefore, I encourage you to read the Safe Harbor statements on the slide. At the end of the presentation, we will have a question-and-answer session. Please wait until we bring you the microphone to ask a question to ensure it is heard on the webcast.

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And with that, I'm pleased to introduce our Chairman and CEO, Greg Goff.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Good morning, everyone, and thank you for taking the time to come here today. I think this is my sixth investor and analyst meeting, and I have to be quite honest with you. I'm probably as excited today as I was six years ago.

We have some great things to talk about today and we have a fantastic leadership team that's going to be able to share our story, and then we are going to open it up for questions at the end of the session here. So thank you for coming and I know we look forward to your probing questions.

What I would like to do is start and introduce the leadership team with me here today and I would like to just say a couple things. I think one of the things that is good about our leadership team is that we work together extremely well. We are a very effective group of people, highly committed to really doing great things, and I think you'll see that as they talk today.

So the first person that I would like to introduce is Keith Casey. Keith is our Executive Vice President of Operations, so he runs refining, marketing, logistics, our major projects group, and today Keith is going to share with you how we are driving refining excellence in our Company and then also talk about some of the major strategic investments that we are working on over the next couple of years.

Phil Anderson will follow Keith. Phil is the President of Tesoro Logistics and Phil is going to share with you our story about the logistics company, one, how it fits into our integrated business model and, two, our plans and intentions to continue to grow the logistics business.

CJ Warner will follow Keith. CJ is our Executive Vice President of Strategy and Business Development, and CJ is going to talk about how we see growing the marketing business to create additional value for the Company. We spend a lot of time looking at the marketing business. We have a very good view on the opportunities that we see available and CJ is going to preview that with you today that really fits, once again, into our integrated business model.

And finally, Steven Sterin, the CFO of the Company, Steven is going to come up and share with you our financial plans. He is going to give you some look-backs on what we have been trying to create, and then also go in and share with you our projections of what we plan to do going forward. And then, we will open it up for questions and be glad, myself and everyone else, to entertain the questions.

We are also proud today to have four members of our Board of Directors here, and at least in my time with the Company, the Board of Tesoro has really been instrumental in helping in the formulation of a strategy, our execution of the business, and the general oversight of the Company, and they have been incredibly supportive of the management of the Company to help us in the journey that we have been on for the last few years. And I'd like to just briefly introduce each one of those Board members here today.

The first person is Rodney Chase. Second is Bob Goldman. The third person is Jim Nokes, and Mary Pat McCarthy. We're really appreciative of them taking the time to come today.

So let's get started. When we look at the Company from how we are positioned in the marketplace, we see four significant things that stand out for the Company. First is our focus on driving improvements in the business over time. We believe we have developed a very good track record of driving those improvements and creating sustainable earnings growth.

And one of the things that is important to us is that we look at that on a margin-neutral basis, so we are not driven by crack spreads. And even though crack spreads in the West Coast have been extremely high this year, that's not what drives us. What drives us is how we create improvements in the business by our ideas, our execution of those ideas to grow the earnings of the Company, and we're going to share that with you today. Matter of fact, each of the key leaders will share that with you today.

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The second thing is about our culture. And our culture is one where we step up to focus on how we execute the business to deliver exceptional results all of the time, and I'm going to talk to you just a minute because we think that's extremely important about what type of company we are and what it allows us to be able to drive improvements in the business by taking ideas and executing those ideas.

The third is about our portfolio. If you looked at the portfolio of the Company back in 2010, where it is today, and where Steven will talk to you about, by 2018 we are significantly reshaping the portfolio of the Company. In 2010, it was 20% marketing, 80% refining. By 2018, we hope to get to be 45% refining, 30% logistics, and 25% marketing, and from an intermediate standpoint -- I will share with you that in a minute, we are on our way to getting there.

And then, finally, we pride ourselves in how we use the cash that the Company generates and how we can effectively allocate capital to grow the business, return cash to shareholders, and do that very, very consistently.

Back in 2010, we developed these strategic priorities for the business. To me, they are the roadmap. They guide all of the things that we do. If you take these strategic priorities and you listen to what we talk about today, you can see that they are foundational to what we are trying to do as a Company. I am not going to go over all of them, but they are truly part of what keeps us focused as a Company and they underpin the strategic direction that we pursue as we go forward with the Company.

I have always talked about how important the value chain is to Tesoro. We operate this integrated value chain from feedstock to how we go to the market, and this picture shows in the simple way what that is all about. But we believe the success for us is in how well we can execute all the way along that value chain.

As a matter of fact, we are working to develop a core competency in value chain optimization, which we believe has the potential to enhance the contribution to the business probably somewhere in the order of magnitude of 20% to 25%. Now some of that we'd get today, but all of the decisions that are made in how we buy crude up in the Bakken to how we go to the market in Los Angeles not only both tactically, but strategically, allow us to really capture value along that integrated value chain, and this is our business model. This is what allows us to drive the profitability of the business.

And you'll hear today different people talk about different parts. Keith is going to talk about refining. Phil is going to talk about logistics. CJ is going to talk about marketing, but what is important is how we integrate across that value chain to really add additional contributions to the Company.

I had mentioned earlier I wanted to talk briefly about our culture because at the heart of what we do is really how we work. And I mentioned our strategic priorities are our roadmap, but our culture is the compass for the Company and we are very performance oriented. We are a performance-based culture. We set ambitious plans and then people come together and work to drive those improvements in there.

Our compensation systems are designed to reward and recognize both the Company and people for making good things happen, and it is really core to us to be successful because our business requires superior execution. To really execute the business well, we have to be firing on all cylinders all of the time, and that's what I believe allows us to drive what we call business improvements across the whole value chain is being able to have a strong culture in the Company.

Back in 2013 when we looked at the Company, we felt like we were very focused on creating value, but we felt like we needed to take play a bigger game, and that game to us was looking at all of the key stakeholders that we impact in how we do business. And we are very much a principles-based organization. We establish principles and we make decisions and take actions based upon those principles, but we believed back in 2013 we had progressed enough with the way we wanted to move the Company that we could start to look at the impact that we had on other key stakeholders, and we call it shared value.

Our view is that it is possible to not only create value for the owners of the Company, a lot of you in this room, but also the communities where we operate, employees in the company, how we interact with the government, which is our biggest challenge in executing our business. So we are very focused on looking at value creation from a broader perspective than just shareholder value creation because it provides us, in some cases, like this slide says, our license to operate.

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And I think what we will show today when Keith is up talking about some of the strategic projects we are doing, so you can look at the economics and the strategic implication of those projects, but also what will show up is how it impacts the communities, whether it be by reducing emissions or, in some cases, having a very significant economic impact in the communities. But for us, it is important to take a broader look at the Company and look at the impact on these key stakeholder groups.

Just briefly, the business has changed a lot over the last five years. We're not going to talk a lot about that today, but we are going to talk about where we want to go over the next few years, but just a few key things here. The geographic area where we operate is ideally suited for us to be an integrated value chain, the nature of the markets and how we can go to market, and that fits our business model like a glove.

And you can see over time we have made lots of progress in executing that integrated business chain, whether it be through enhancing the profitability of the Company, growing our integration and marketing, and CJ is going to talk about some significant steps that we plan to take in the marketing business in the next few years to further strengthen our position there in the market, but we have made very, very good progress in the Company.

And if you look at that transformation, I mentioned earlier that back in 2010 we were at this 80%, 20% split. We want to get to where we are 45% refining, 30% logistics, and 20% marketing from a contribution from EBITDA standpoint. This slide is like that intermediate step here back in 2015. 2015 will be an exceptional year for Tesoro. There is no question about it. We will have -- in many, many things that we measure, we will have exceptional results.

But if you look at where the portfolio is today, you can see that we're still 65% refining, 20% in marketing, and 15% in logistics, so we're reshaping that portfolio, and the things that we're going to talk about today will help you understand between now and by 2018 how we expect to get to the portfolio there, and Steven will highlight that in his presentation.

I'm going to talk briefly about the market, then I really want to share with you what we are trying to do in 2016, and then a little bit into 2017 and 2018. So we see a market environment in 2016 through 2018 from the Tesoro index standpoint that is different than 2015. We believe 2015 was somewhat of an exceptional year, particularly in California, and we do not see that continuing. So we see a step down.

And how we look at it is we go back and we reference 2014, so you can see the Tesoro index in 2014 was about \$11. So we see about \$1.50 to \$2 improvement across our system in the Tesoro index and that's primarily driven by favorable fundamentals for the business. We see positive demand. We see the exports still being able to leave the United States, even on the west coast of the United States, and that translates into higher refining utilization, which is one of the key drivers.

Therefore, we see a gradual improvement in our index across our system for next year. But it is quite different than what we have experienced this year.

From a marketing standpoint, similar type of outlook. So we see 2015 has been an exceptional year in marketing for our Company. We see a drop-off in margins a little bit, so you can see that we have a range of around \$0.11 to \$0.14 a gallon.

You can look back historically, so if you reference 2014, you can see we see margins in that area to slightly getting better, and what we talk about today is the basis for how we look at the Company going forward.

So briefly about PADD V and the west coast of the United States, everyone knows we have a very substantial position there. It is an important part of the Company. We see the overall fundamentals, market fundamentals, on the west coast, we see them positively. We see a continuation of a multi-year improvement in the general economy on the west coast, which for us is translated into higher demand. It is translated into more vehicle miles traveled.

And so as we look out into 2016 and then a little bit beyond that, we see a very favorable market environment on the west coast of the United States. But it is different than what we saw this year because we don't see some of the incidents that have happened in 2015 repeating themselves.

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The Mid-Continent, where with our Salt Lake City and Mandan refineries we would see from a very positive standpoint, those two refineries, as Keith will share with you, how they compare in the industry are exceptional assets that perform extremely well. So, we have a very positive outlook for those refineries in what we refer to as the Mid-Continent area.

From a crude standpoint, where -- we don't see a lot of upside in crude oil prices in 2016. I'm not going to get into all the fundamentals. Everyone can have their own views on that. But we see prices generally like they were this year. I think so far they have averaged maybe \$50 a barrel for Brent crude, and we see it there or slightly higher, but we do not project in our -- the way we plan to run the business a substantial improvement in crude oil prices in the short term, particularly in 2016.

And we see differentials relatively comparable to what we have experienced this year, some a little bit different, but in general we don't see dramatic changes that are going to impact our profitability based upon crude prices or on crude differentials.

So in 2015, as I mentioned earlier, we have had an exceptionally good year. It didn't get off to that type of a start. 2015 was a pretty bumpy start for us, but we have picked up a lot of momentum as the year went on, and what's important to us is last year at this time we stood up here and we committed that we would deliver somewhere between the \$550 million to \$670 million of improvements, and as we sit here today, our projection is that we will exceed that range. If you take the midpoint of that range, we will come in at about 15% above it or right around \$700 million of improvement.

So I think it gets back to our culture, about our ability to drive improvements. And maybe one thing that is worth saying is that we have a system within the Company, so we -- not only do we train everyone to drive improvements in the business so it can be a part of our culture, we also track every individual improvements that we have. We validate everything that is done and combine them here to show you what we're able to deliver in the Company.

So you can see we have had strong execution. It has been an outstanding year that we will be able to deliver that \$700 million that we project by the end of the year, and it really provides the foundation as we look forward.

So for me, this is the most important thing that I can share with you today, so I am going to take a minute here and just hit all of these key points because once I have done sharing that, then between Keith, Phil, CJ, and Steven, they will build upon this.

So the first thing is next year we expect to deliver between \$900 million to \$1.1 billion of growth in earnings based upon our earnings -- our margin forecast for 2016, not the 2015 forecast. So if you look at the things we're going to do, we see that improvement in our earnings of between \$900 million and \$1.1 billion, and it is comprised of two pieces, which I will show in just a minute, but it's important to lay these out.

The first piece is \$400 million to \$500 million of our improvements in the business in many facets of what we do that we have been -- that we work on every single day. That's one piece of that.

The second piece of that is that when you look at how we operated this year, as everyone knows we were significantly impacted in the first part of this year by a labor disruption that would -- that impacted our refinery utilization, and then some of the heavy maintenance work and some projects that we executed also got into our maintenance work, so we see \$500 million to \$600 million of upside based upon how we will run next year, and Keith will share exactly how we're going to be able to deliver that.

So the first thing is we see a pretty significant opportunity for us to drive earnings growth in 2016.

The second thing is we laid out a target to grow our logistics business to \$1 billion by 2017. Everything that we wanted to achieve in 2015, we have been able to do. Phil is going to talk to you about this more, but even in a very difficult oil and gas price environment, we have clear line of sight to that \$1 billion, and so we are on target to drive that \$1 billion in logistics growth by 2017.

Probably the most interesting and exciting part, which is a big change for us, is the opportunities that we see with marketing, and CJ is going to share that with you. But our plans in our marketing business are to be able to get the EBITDA contribution from marketing to over \$1 billion by

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2018, and that comes in two pieces -- what we do with the current business we have and the opportunities that we want to be able to go capture. And CJ is going to go into detail and share that with you when she is up talking.

So when you go back and you reflect on my comment about the composition of our portfolio between refining, marketing, and logistics, these plans and these actions and our ability to deliver them is what allows us to reshape that portfolio and how the earnings of the Company come about.

And then, finally, during Keith's presentation, we have four major projects that probably most of you are very familiar with, some we've been working on, like Vancouver Energy, for a long, long time. But we have those projects in place and we're going to talk about those projects.

What is important about those is with our free cash flow, we are able to allocate free cash flow to those projects over the next few years, and when we are done by 2018 they deliver around \$350 million of annualized EBITDA, but they are very strategic projects. So not only are they highly attractive from a return standpoint, what they do for our business has significant strategic implications that are very important.

For 2016, we have a very clear plan to get to the numbers. Each person will share them with you. I have highlighted this. If you look at what we've done from 2011 and what we will do by the end of 2015, we will have driven about \$1.8 billion improvements in the business. It is foundational to how we run the Company, and we're on that journey to continue to do that, as you can see.

So next year, excluding the improvements that we see by just how we operate, the \$500 million to \$600 million by not having the impact of the labor disruption and getting higher utilization to where we think we will be, then we will deliver another \$400 million to \$500 million of improvements.

And beyond 2016, we have a view that we will be able to continue to do additional improvements. As you can see, somewhere between \$750 million to \$1 billion over that two-year period of time. Interestingly, the contributions from the major projects we are doing only partially kick in during 2017, so the bigger impact is once you get out into 2018, but we will talk a little bit about this, but we are more focused on what we're doing next year.

So with that, I think as we go through today you will be able to see with each of the key leaders of the Company talk about what they're doing, it will be able to give you some confidence in these plans that we have talked about. So, Keith.

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### **Keith Casey** - *Tesoro Corporation - EVP Operations*

It's great to be with you here today. This is my third time with you to talk about the progress that we made. It is always the accountability, what did we accomplish last year, and there's that commitment going forward of what are we going to commit to and what are we going to accomplish going forward.

I'm like Greg. Each and every year, I'm more excited about the potential and the value creation that we are able to deliver through this business. So today, I am really going to share the story of how we are driving excellence within our refining system.

And as Greg said, for 2016 that is going to show up in the form of about \$200 million of business improvement -- \$200 million of earnings for business improvement, and then we are also going to deliver \$500 million to \$600 million of improvement year on year because of the increased utilization and capture because we're not going to have the labor disruption.

The other great thing that I get to talk to you about, as Greg mentioned, is the transformative projects that we've been working on for quite a while in our portfolio. I'm going to be able to share some progress updates because we have got some exciting news there.

Before I start and talk about refining, I really wanted to set some important context on, as Greg said, the way we differentially operate and think about operational execution. So these are corporate-wide environmental health and safety results, and as you can see from the data, we actually from a personal safety standpoint perform at best-in-class levels within the industry. And from a process safety standpoint, we actually perform in the top quartile, which is better than 50% to the industry, that top quartile of process safety performance.

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And we continuously strive to reduce our emissions and our environmental footprint. And as Greg said, we believe this is core. This demonstrates our core values and our shared value to our employees and to our key stakeholders in how we do business. So as you think about all of refining, marketing, and logistics, even our central ops business, central functions, we're committed to creating that incident-free environment and continuous improvement in the way that we execute our business.

And in refining, we have a highly competitive refining business that has been purposely built to be incredibly flexible and durable to meet the market demands. And the essence of our operational execution really comes down to three things. We're in great markets. We have excellent advantage to advantaged crude oils and very strong product demand for our products.

We have great assets, again underpinned with that drive for reliability and utilization, that they are highly flexible, I think distinctively flexible. And our ability to meet the requirements of the market, either gasoline or diesel or all the products that we produce.

And finally, we have skilled and dedicated people that have a mindset of continuous improvement and driving that improvement through all phases of the business.

The exciting thing is for each one of those three things we have a very detailed and clear plan that we're going to extend those capabilities into the future.

When you think about our portfolio, with almost 740,000 barrels a day of capacity on the west coast, we have a very large and competitive position on the west coast -- four excellent refineries with just absolutely superb waterborne logistics connectivity, so not only for crude oil, advantaged crude oil access up and down the coast, but also the intermediates and blendstocks that we can move across the coast and, again, getting those products to the markets.

Within the Mid-Continent, and as Greg shared, we have two highly competitive refineries running 100% advantaged crude with excellent markets for product demand and highly integrated product channels.

We are very competitive and we seek to extend that competitiveness throughout our entire refinery system. And this is all enabled by superior logistics. Phil is going to talk to you a little bit about that in our next section.

So as Greg shared, our fundamental business model is of a highly integrated value chain, and when you think about the center of that value chain, it is the robust refining system. And that really provides the platform for not only the optimization of the refining system, but a lot of the logistics and marketing growth that you will hear about in the next sessions.

During a recent analyst visit to the west coast, we were asked the question, do you optimize by refinery or do you optimize by region? And the answer appropriately by the refineries was yes. We optimize each of the refineries, then we optimize within the regions, and then we optimize the entire refining system.

And a great example of this, just to put a fine point, in 2015 we had very strong product demand in California, and we move about 50,000 barrels a day of intermediates and blendstocks across our system, and through our movements of octane to support that demand in southern California from the rest of our system, we made about \$15 million to \$20 million being able to supply that and optimizing from the entire system. So, just great examples of optimizations taking place each day.

So as I said, we have purposely built this flexibility into our asset base, and it is really the ability to swing production from gasoline to diesel or vice versa, depending on the market demand. And what you see on this chart, actually in the upper right, it looks like a pretty typical seasonal demand between gasoline and diesel. But if you actually interrogate what's occurring on a daily basis and a weekly basis when there is those product demands, there is much more acute changes that are taking -- taking place in the differentials.

And if you look at it, that volatility on average has been about \$8 a barrel over the last five years; about 60% of the time, it has been for diesel, 40% for gasoline. So the average volatility, about \$8 a barrel, and a maximum volatility of \$60 a barrel.

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And that's why we believe flexibility and agility are really the key for competitive advantage. Importantly, our swing capability, which we have driven this 10% capability of our production to swing, is incredibly agile. We can often execute that in less than one 12-hour operating shift to meet the market demands. And just a bit later, I am going to share with you how that is an important feature of our integration and compliance project.

When I talk to folks about the complexities of refinery, and Greg actually talked about the importance of reliability, I get pretty excited because we have got thousands of miles of pipe, hundreds and hundreds of pumps, and men and women in blues and coveralls that 24/7 are operating dynamic processes.

And thinking about that objective that we are trying to get all of that right 100% of the time, 100% of the time, the entire team is striving for that level of perfection. Well, we hold ourselves to the minimum standard of magna cum laude reliability results, which is really that 97% to 98% availability within our refining system. That is world class. When you look at what is world-class reliability, that is the number. And that's the standard that we hold ourselves to.

So when you think about that, it is kind of like going to college or grad school and never accepting less than 98% on an exam or a quiz. It is that level of excellence. And we believe that's really important because that allows us to run at high utilizations and high utilizations to supply the market demand.

As you look at these two charts that are there, those gold bars actually represent that \$500 million to \$600 million of improvements that we will drive in 2016. So that higher utilization, our ability to optimize and capture and deliver that from the marketplace, and that's where the improvements are coming through.

Sustaining that level of performance is obviously very important. We have been investing in our operations excellence management systems, which is, simply stated, our game plan for how do we operate, and it provides a consistency and a base for continuous improvement, so it gets better this shift and the next shift and well into the future.

Underpinning all of that reliability and availability is a very disciplined investment program. In turnaround spend, roughly \$250 million to \$300 million a year really assures our capability to produce products through the cycles of the units. And sustaining capital is actually executed with that shared value mind state. Greg mentioned playing the game a bit differently, a bigger game.

We really think about sustaining capital as our opportunity to improve reliability, decrease our lifecycle operating cost, and very importantly reduce our emissions footprint and improve our compliance performance. So like all of our objectives, this comes down to how do we execute, and a great example of how we execute, I think, occurred last year in our 2015 hydrocracker turnaround in Los Angeles.

The team got together and said, you know, we are going to raise the game. We're actually going to execute this turnaround in a flawless manner, and they did. They shut down a hydrocracker and major hydrogen processing units with zero flaring. That's incredibly rare in our industry, almost unheard of. They executed all of the turnaround without an injury and they restarted the units again with zero flaring. Very, very rare in our industry.

But that's not enough. They did that on schedule and under budget, and the really amazing thing is -- this is where this business improvement continues to carry through -- we had just installed a new line from logistics connecting the two refineries, called the [7179] line, and they were able to execute that major hydroprocessing conversion unit turnaround and maintain full crude throughput, which was to the benefit of about \$50 million in being able to run that full throughput as we executed that.

So just a great example of how we are focusing on getting the maximum out of these investments that we are making by how we execute.

This Greg shared with you, this track record of delivering business improvements that we have within Tesoro, and it is really built on this foundation. 95% of our staff now is yellow belt trained with Lean Six Sigma tools, and we have got a growing army of green belts and black belts that are driving this performance improvement. Within refining alone, that is going to be \$200 million a year of business improvements on an annual basis, and we believe that we will be able to, because of people's capabilities, continuously deliver that.

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It shows up, as you can see in the pie chart on the left-hand side of the chart, in flexibility and yields and optimization. That is everything from optimizing gas oils around Martinez to the example I gave you earlier about octane. That's not just a waterborne example, though. We have actually optimized olefins from the Mid-Continent to the west coast to the tune of \$2 million to \$3 million this year as well, so really extending that flexibility advantage.

When you look at the distribution and cost management, I start thinking about our supply chain activities because we are really driving -- whether it is reductions in trucking costs, equipment rental costs, or leveraging our spend with major suppliers and contractors, that is coming through in the form of tens of millions of dollars in each of those categories.

When it comes to operating costs in general, as Greg said, very disciplined approach, and we really think about sustainable costs, so inflation in our business is about 3% to 4% annually and we are looking to do everything we can to offset that inflationary effect, and then also deliver improvements faster than our competition, and that's what we have committed to do by 2018 on a competitive basis is further reduce our operating expense by \$150 million on a competitive basis.

Central to our high-performing culture is the desire to win, and unfortunately, it is not nearly as exciting as the college football championships, but we do have the Solomon Study in refining. Very well known, respected, very defensible study of everybody in our industry, not only on a national, worldwide basis. And the most recently published results showed our system improving in all areas of performance with a clear trajectory towards first quartile.

And very importantly, as Greg pointed out, our Mid-Continent refineries, both Salt Lake City and Mandan, are actually in the best-in-class net cash margin position within that study. So it is just exceptional performance and delivery by those refineries, and, again, the great thing is we have developed a multiyear plan to continue to drive towards that first quartile performance across all of our system in the future.

Pulling this all together is really strong EBITDA generation. In 2015, it is going to be approximately \$2.5 billion of EBITDA generation in great markets, advantaged crude oil access, very strong product demand this year, and a purposely built portfolio that is very flexible in being able to commercially optimize across our value chain. And it is all driven by this high-performing culture, coming into work each and every day, each and every shift, driving those continuous improvements.

So as I reflect on the performance of the refining system, like Greg I get more excited each year as I'm here in thinking about delivering the value and the full potential of this business to the bottom line.

Now, as I told you, I also get to update you on some strategic investments, and we have talked about a few of these for the last bit, but really give you some news on the exciting progress that we are making on each of these.

And when we think about creating value, and I'm just going to step back a second, really share about creating value because these projects are much more than building process, units, or tanks. There is bigger things that we are trying to accomplish.

When you think about formalizing competitive advantage and fully integrating our value chain, that is really what the Los Angeles Integration and Compliance Project is about. And when we think about creating value, we are not just thinking about advantaged crude oils in front of our refineries, but we're thinking about how that supply to the west coast of advantaged crude oils can change the shape of the crude oil supply/demand dynamics for the west coast. And that's what we are trying to accomplish through Vancouver Energy.

And then when you think about the mixed xylenes project, so it is much more than building a xylenes extraction unit and an isomerization unit, but it's really our ability to take a competitive advantage in our position in a very unique way and enter a high-growth market within Asia for our product. So it is really, really exciting.

But no doubt, not unlike our southern California acquisition when we bought the refinery, the logistics, and the marketing business, these are not easy to permit or execute, right, but there is tremendous value in being able to accomplish this.

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Greg showed you earlier in one of his charts that these new business investments contribute \$50 million to \$100 million of EBITDA beyond 2016. In fact, they actually contribute to an EBITDA run rate of about \$350 million beyond 2018 or at the end of 2018, so a very significant contribution as we continue to grow our capabilities.

This is the Los Angeles Integration and Compliance Project, and, boy, it has been a pleasure. I have had the pleasure for the last three years of talking about all that we have accomplished through our acquisition since 2013. Whether it is the \$500 million of synergies we have been able to deliver to the bottom line or the close to \$1.8 billion of drop-downs to TLLP, this business is performing very, very well this year and it is going to contribute -- that region will contribute onwards of \$2 billion of revenue to our 2015 results, just fantastic performance.

And when you think about it, we have been doing that with one arm tied behind our back. We have yet to formally connect the two refineries and update all the process units as one side. We have done it with one management team and we have done it through creativity and our logistics -- existing infrastructure, but that's what this project is really about is formally connecting these two assets, and we're going to modify 12 process units so that we get that flexibility, again 30,000 to 40,000 barrels a day of gas to distillate flexibility.

And then, we do two large pipelines, 45-inch bores going under two major transportation corridors, and I think all totaled it is something like 18 miles of pipe that we are putting in in these projects that will formally connect and unleash the full power of a full integrated site, and that's the exciting thing about this project.

And back to that earlier conversation about flexibility, and I think this is a really important point on the gasoline to distillate flexibility, we see that competitive advantage. We stress-test these economics in a high gasoline environment and a high distillate environment and they are incredibly durable in both environments, so we are not committing all to one product or the other; we are committing to maximum competitiveness through the way we design this configuration.

Vancouver Energy and really the crux of this project and strategic project is really taking advantage of the amazing infrastructure that exists already at the Port of Vancouver, the couple hundred million dollars that were spent in this port that has been in business for over 100 years to really advance the logistics infrastructure.

As you can see from the photo, the areas in aqua, Vancouver Energy is actually a pretty straightforward project. It is six tanks. It is a rail unloading barn and it is modifications to a wharf that already exists.

This project is going to impact the west coast crude dynamic. It is going to give Tesoro the ability to get more advantaged crudes in front of our facilities and it is a substantial logistics opportunity for us as a Company.

So, again, I will just briefly touch this. Looking at the economics, even in this narrow crude differential environment, very robust 40%-plus internal rate of return on this project.

We hit a major milestone this month. The draft environmental impact study was released by the Energy Facility Siting Evaluation Council. It is an extensive document, if you haven't ready yet. 850 pages, [3,500] pages plus or minus of appendices.

And we have begun the next phase, which will be the comment period, which wraps up about the end of January, and then we will get into the adjudicative phase, which is really a formal process to address any and all concerns prior to make a recommendation to the government. So, we feel very good about the progress we have made, feel good about that milestone, and we're entering the next phases, hopefully be able to wrap up this permitting process in 2016 and be in service in 2017 and deliver this advantage.

The Mixed xylenes Project is more than building a process unit, more than building some tanks, and I think the graphic shows that while we have this competitive advantage in our locations in the west coast and transportation to Asia, we also have a manufacturing cost advantage in the way that we're able to optimize our facilities to produce these mixed xylenes. So it is really taking advantage of both of those things and entering that growth market, the 5% to 7% per annum growth market of the xylenes within Asia.

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There is multiple logistics and commercial strategies that actually evolved from this strategy that are very, very exciting when we look at the full potential. And again, regarding the economics, so we've stress-tested this. With the shift in flat crude price, with the compression of natural gas costs in Asia, as well as the demand cycle for mixed xylenes, that 5% to 7% growth, we have stress-tested all of those and have very durable economics on this project. So we're really excited about this. We are hoping to progress and be able to start up in mid-2018.

Then we transfer over to the isomerization and naphtha optimization, this would be a standard refinery project. You need to clean up your naphtha systems and be able to replace that octane to make the new Tier 3 gasoline requirements.

What's different about this is it is synergistic to mixed xylenes for us. That's the big story here. Not only does it help us produce more of mixed xylenes and synergistic with our [prod], but it also reduces our octane production costs on the west coast, which is really advantageous for us as we go forward. And that's why these two projects have been combined together and are actually progressing through the permit phase under the name of Clean Products Upgrade Project. So, it is Clean Products Upgrade Project.

So before I turn it over, I'd really like to reiterate that operational execution and how we think about our delivery. Whether it is in refining or logistics or marketing, it is that same focus, that focus about creating an incident injury-free workplace and that spirit of continuous improvement through all phases of our business.

And when you really think about not only the driving for refining excellence I just spoke about, but also these new business and strategic investments that we are looking at, just for a moment think about how each one of them is enabled, improved, or extended by logistics because it is really logistics that helps us create -- bring that value creation to the bottom line. Phil?

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**Phil Anderson** - Tesoro Corporation - President Tesoro Logistics GP, LLC

We launched our logistics strategy at Tesoro. We are coming up on our fifth anniversary this spring with logistics. And it is really -- the strategy all along has been to develop an engine of growth within Tesoro and really build a great business and really have done that in three ways -- organic investments, drop-downs, and strategic acquisitions.

And that's the three themes I'm going to focus on today of how we have built this great business. We will talk about how we're positioned today, which is very strong, and about how we see this business growing over the next few years, which again, as Greg mentioned, despite a difficult market environment, we believe very strongly that we have got some really great opportunities to grow the business.

So there are some facets of our strategy that we think make us distinctive, and I will talk about these today. First, as I've said, we have built a very strong business already in nearly 4-1/2 years. We have got real execution capabilities within logistics. We are serving third-party customers in addition to Tesoro and we are driving a sustainable growth strategy around the business that really propels us into the future.

The other thing that is distinct in this commodity environment we live in right now is that we have got really great vibrant markets that we have insight into growth opportunities. We will talk a minute about some of the downstream business that Greg talked about. That really delivers us a significant amount of opportunities for us in the logistics space.

A couple years ago, we identified a goal to reach \$1 billion of EBITDA within logistics, and we will talk about it today. We really have a pretty clear path to reach that number at this point in 2017 and we are really viewing that more as a milestone at this point in our journey as opposed to a destination, to continue to grow beyond that number.

And lastly, part of our strategy is to look at logistics as a platform for acquisitions, and we have been very effective at acquiring assets that really fit our strategy. We have got some great new examples we will talk about this morning. We will also talk about how we think about that in the future.

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Let's look at our strategic footprint. As Greg mentioned about Tesoro, we are very well positioned in this market. We have an incredible refined products terminalling and pipeline network. That's the one in this low price environment that really helps drive volumes and growth for us, and that is turning on a lot of new opportunities.

Secondly, if you look at our Mid-Continent gathering business, with our Rockies natural gas focus and our Bakken crude oil business, we are well positioned in these now mature fields. With the combined commercial and execution capabilities now inside that business, we are able to deliver new projects despite the challenging market environment, and we will talk a little bit about those more today, but we also think there is incredible upside potential within those markets.

Let's step back and look at the 4-1/2 years that we have had this strategy. We have grown EBITDA within logistics by nearly 1,500% in 4-1/2 years and we have done that while investing and diversifying our business, and that has delivered very steady, high, consistent growth in distributions to the TLLP unitholders.

If you look at 2015 so far and where we are ending the year, we are covering our distribution to TLLP at a factor of 1.3 times, so the business is coming through this very difficult period in a position of strength and really setting us up for the future for that platform to continue to grow.

As Greg talked about, the enduring principles that drive Tesoro, these have really been our enduring principles of growth around TLLP since we started down this path. And it is what drives us every day and it is what continues to drive our thinking about the future. And that's -- it is really quite simple, but it is maintaining minimal commodity exposure. It's that culture of driving business improvement where we get the assets, we drive optimization value through the assets, we invest organically around the assets, and we are obviously very biased around optimization of organic growth because we think we get our best returns there.

And lastly, it is strategic growth, and we have done that really in two ways, and that is direct investments through TLLP, as well as supporting Tesoro in its strategic growth, and that continues to drive our thinking about the future in terms of how we will continue to build this business over time.

What underlies all of this and is very important right now is to understand that Tesoro, we really see Tesoro as the steward of this business. It supports the business and it really, as part of the integrated strategy that we pursue, this is key -- it's that key engine of growth that really supports that strategy, so we really focus on it very strongly.

All right, let's transition to looking forward. This summarizes our organic growth and drop-down plans for the next several years. I'm going to dive down into each segment over the next few slides, but I want to call out a couple takeaways from this.

First, in 2016 you will see that we are growing EBITDA by nearly 30% over 2015, and that is really based on projects that are largely complete at this point, beginning to deliver new EBITDA for us, as well as drop-downs that we will talk about in a minute, a couple of acquisitions that have recently been announced that are poised to be new additions to our drop-down plans for 2016.

Secondly, as I talked about our goal to reach \$1 billion, you can see in 2017 with our plans that are in place right now we have got very clear insight into delivering that goal, and then you can see beyond that our intent to continue to grow the business.

So with that, I'm going to dig into each segment quickly and just talk about -- a little bit about how we see that growth unfolding. Starting with our gathering business, the first thing I would point out is that in 2015 we see that business generating \$395 million to \$400 million, a big increase over 2014, and if you go back a year ago, we had just announced the acquisition of our Rockies natural gas business, and I'm very proud to reflect that business is performing very well for us. Volumes are up nearly 10% in that business versus a year ago and our EBITDA performance is expected to be at the high end of the range that we told you last year.

And even in Bakken business, volumes are up 30% this year, so when you look at this segment and the difficult market environment, the strategies and plans and projects that we have had in place, we've very successfully executed, and that really sets us up for the next round of growth.

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If you look at next year, in 2016 we plan to invest \$250 million to \$290 million in organic growth in this segment. In the Bakken, there is really two feature areas there. The first is that our pipeline, our High Plains Pipeline, is really very well positioned around the core of the Bakken where production and drilling continues to take place, and we have the opportunity to expand some key segments of that pipeline and really pick up crude oil that is in that market now, that it is much more efficient to get that crude on a pipeline as opposed to a truck. So, that's a really good project even in the current environment.

The second is to continue to expand our gathering infrastructure, and we recently announced a new project in that area that we will be executing next year, and I am proud to say that we continue to have discussions with producers up there as the gathering infrastructure largely lagged the development of the field by a couple of years and needs to continuously be built out just to catch up to the current level of production.

In the Rockies, we are seeing producers there benefit from technological advancements and dramatically improving their well productivity. When we look at the numbers that they are showing, it really shows that gas being produced amongst the more cost-efficient fields in the US, and so that is allowing producers to continue to drill in those areas.

We have announced two significant compression projects there and that is really supported by the producers and the drilling activity that continues to take place, and we continue to see volumes increasing on our systems, and from what we can tell right now, that continues to be our outlook for next year.

I'm going to transition to the terminalling and transportation segment of our business. And it is this segment is where we really see the impact of that vibrant growth in demand, both domestically in our western US market, as well as export demand through our marine facilities and our pipelines.

This year, we have an expanded portfolio of organic growth in this segment, and that's really driven by that demand. It is driven by some of the projects Keith was talking about. We also have a significant backlog of ideas that we are working through as part of Tesoro's overall integrated strategy that we think will continue to drive this portfolio over the next couple of years. Right now, our target is to grow this business by \$100 million to \$120 million of EBITDA through organic growth and optimization by 2018.

Our focus in 2016, our organic growth, is to spend about \$150 million to \$160 million, again those two main drivers. The demand-driven growth really shows up in our terminals where we have got the opportunity to expand capacity in our terminals. We have got demand to expand the Northwest product system that moves products from Salt Lake City up to the Pacific Northwest and we have got demand to add biofuel services amongst our west coast facilities.

The second key component of our growth portfolio here, as Keith talked about with the LA integration project, is the pipeline bundle is a project that will be undertaken at the TLLP level and is a significant benefit for us in terms of helping us drive our organic growth and delivering increased EBITDA through this segment.

So let me total up our organic outlook. Across the planned period, our intent is to spend about \$1.5 billion on organic growth and the EBITDA from that is \$235 million to \$300 million of EBITDA. These projects fundamentally have great returns. In the gathering space, the projects are well supported by commitments. It is all the components of logistics growth with projects that are put together in a way that really drive our business in a secure way.

Let's transition and talk about drop-downs a little bit. We've divided up the portfolio into a couple different categories this year. The left side, the traditional way we have looked at it, we see \$350 million to \$500 million of earnings that can come down to TLLP over time. And that is really traditionally where we know everybody focuses, and those are great opportunities.

The other way to look at it is if you look at the new business opportunities, and a lot of this stems from the opportunities that Keith outlined, the major logistics components that are parts of those projects, or you looked at, say, the recent acquisitions that we have announced at Tesoro, the focus on driving new value and getting new value through drop-downs into the MLP is really the core of where we would really prefer to spend our time going forward.

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The other takeaway from this is that drop-downs -- really, it is a continuously dynamic portfolio. That's how we look at it, it's how we think about it, and it is really core to our strategy to drive this opportunity set over time.

So let's step back, and again, we think about how we're distinctive. If you look back at 4-1/2 years and how we have grown our logistics business, it's this focus on new value, which has been the source of almost all of our growth.

Let me explain the chart. The blue bar reflects EBITDA and activities that were inside Tesoro when we IPO'd the business. The yellow bar reflects EBITDA from our organic growth, the optimization, and acquisitions that we've done since we IPO'd, and so you go back to the strategy of logistics as an engine of growth, an engine of driving new value, this really illustrates that. In circa 2015, only 15% of our EBITDA comes from those pre-existing assets. And it is really that thinking that drives us in the future.

Okay, so the last major category of growth, strategic acquisition. We want to talk for a minute about how we think about that. In 4-1/2 years, we have had three major acquisitions at logistics -- the Northwest Product System, the Carson Logistics assets, and the Rocky Mountain natural gas business. And all three of those acquisitions have performed very, very well in our portfolio.

And we remain focused on core assets as part of Tesoro's integrated strategy. But we're also very focused on assets that deliver third-party business for TLLP. Now with our full service capabilities, we are starting to expand our sites to some of the adjacent geographies as we see crude oil development in the Mid-Continent, especially Powder River Basin, DJ Basin. With our integrated approach, we believe that expands our opportunity set a little more.

So I am going to talk about a couple of new opportunities that we have recently announced. The first is Tesoro's acquisition, pending acquisition, of the Alaska marketing and logistics business. If you step back, last year CJ outlined a number of steps in our strategy to improve the business in Alaska, and we have taken those steps, and these assets really fit perfectly into Tesoro's overall strategy in terms of marketing and distribution of products throughout Alaska.

There happen to be some great logistics assets in there that integrate very, very well with our existing logistics footprint in Alaska. And that creates probably part of our first drop-down relatively early in 2016.

The second one I will talk about, and this slide isn't in the deck necessarily, is the acquisition announced yesterday of Great Northern Midstream. Tesoro is acquiring this Bakken crude oil gathering pipeline, storage, and rail loading business in North Dakota. Again, it fits Tesoro's integrated strategy. It allows us to become very, very efficient around moving advantaged crude to our west coast facilities. It integrates well with our existing footprint up there relative to TLLP and the High Plains Pipeline.

These assets move right through the core of the Bakken and really give us great access to some new areas of advantaged crude. The plan for next year is to restructure this business at Tesoro and really drop it down later in 2016 down to TLLP.

So let me wrap up. In 4-1/2 years, we've been showing you this same slide, and it really does inform and drive the way we think about the business. Our focus has been and continues to be an engine of growth, driving it through very simple business principles through the full support of Tesoro. Again, part of the integrated strategy of the Company focused on every day with everything we do.

That really sums up logistics, and I will turn it over to CJ.

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### **CJ Warner** - Tesoro Corporation - EVP Strategy & Business Development

And now onto marketing, so putting things into context, you have heard this morning from Keith about refining, the core element of our business, and how we continually improve the business, as well as to find significant growth opportunities regularly from this core element of Tesoro's integrated value chain.

And then you heard from Phil speaking about logistics, which is the key integrator between our assets and our very strong engine for growth.

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Now I'm going to be talking about marketing, which is the third essential segment in our highly integrated value chain and also a strong engine for growth.

So some of you may remember that I talked about marketing last year. Well, actually, maybe you probably won't remember because I didn't talk about it for very long. This year, I will be speaking about it more expansively, commensurate with the tremendous progress we have made in growing the business and expanding it and significantly in commensurate with the opportunities that we see in continuing to grow this business.

In fact, our plan, as Greg outlined earlier, is to grow marketing into a \$1 billion EBITDA business by 2018. Now marketing is a key element of Tesoro's integrated value chain. It provides an important service to refining by providing secure, rateable placement of products, enabling refining to schedule at high utilization and enabling us to place those products into premier channels and preferred locations so that we can build additional margin on top of what refining captures.

We have made, as I mentioned, significant progress to strengthen and grow the business, primarily through organic growth, and that has created momentum that we will continue to build on, and we have significant plans for additional organic growth going forward. On top of that, though, we have defined and identified substantial additional earnings growth both in the fuel and in the nonfuel businesses, and we plan to accelerate this growth beyond what we are capable of doing in organic growth through strategic acquisitions.

And our strategic acquisitions will focus on high-value channels, the branded channels in particular, and we will also expand substantially into the convenience area so that we can add diversified income through the nonfuel areas of our business.

So from current performance and forward growth prospects, marketing will be a key element of shareholder value contribution.

It is important to start this story by thinking about what is the strategic fit of marketing within the overall portfolio of Tesoro? At the end of the day, the story is really all about margin, and if we stand back and think about what is the basic way that we add value in our business, what we do is we take crude oil, we refine it into finished products that are much more valuable than crude, and then we deliver those finished products directly to our end users.

And if you look at the bar chart at the bottom of this slide, we can build margin across our value chain by starting from crude, working across the refining system to get to those finished products at the spot market basis, and that defines the refining margin. And then, we successfully -- or successively build margin across the marketing value chain through the various channels of trade, so going from spot sale to wholesale adds some margin and value. Going from unbranded wholesale to branded sale -- branded wholesale and then on to branded retail and then finally to Company-owned retail, selling direct to the end user, continues to build value and therefore builds margin.

So marketing contributes all across this value chain in margin, first of all by supporting those high utilizations that Keith was talking about within refining by creating that rateable offtake, and then marketing builds that marketing margin across the whole value chain.

At Tesoro, we participate in all the channels of trade that you see in this slide specifically because we want to maximize our integration with refining. But our goal when we talk about increasing the value of our integration is to move more and more to the right to capture more and more of that margin in marketing.

Now, the strategic role of marketing is important to keep in mind as we talk about growth because we want to continue to capture that integration value no matter what we do as we grow the business. Marketing serving a strategic role in today's business of Tesoro is in existence in every one of the areas where we have refineries. So we have a strong marketing business in Pacific Northwest, in the mountain region, in northern Great Plains, and in southern California, as well as northern California.

We have a very distinctive approach within brands. We have a multibrand portfolio and we market under both premium and value brands. In the premium brand area, we market under Shell, Exxon, and Mobil, and in the value brands, we market under ARCO, Tesoro, and USA.

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So this multibrand strategy gives us tremendous competitive advantage. In the first place, we can attract a broader customer base by having a diversified form of brands, and we can attract customers who are attracted both by premium and by value propositions and offers. We can also grow faster because with the multibrand portfolio we have more to offer prospective dealers as we are expanding into that valuable branded retail channel.

And finally, the fact that we have multibrand enables us to address the very diverse preferences of customers by geography, so of all these different brands, different ones have different preeminence and different attractions to our customers in the different geographies. So, when you take a close look at our portfolio, the brand mix varies widely by geography and that is because what we're doing is setting up our brand mix to address our customer preferences.

Our strategy has been paying off. We have transformed the marketing business since 2010. So if you look at the chart here, from 2010 to 2015 we have essentially tripled our EBITDA during that period and the projected earnings for this segment in 2015 are \$900 million of EBITDA.

So, granted this was a period of very high margin -- in fact, extraordinary margin, but underpinning this huge success has been essentially a doubling of the volume that we market for refining and our refined product. So we have been expanding our integration tremendously, and we have also, as you note from the pie chart, increased the percentage of branded channel that we use. So if you think back again to this bar chart that I showed you, we have been capturing more and more of that marketing margin as we go along the chain.

We have been able to do that through a series of moves and acquisitions, as well as brand contracts. So back in 2012, for example, we had rights to Shell, but we were able to expand those rights to some of our larger regions, particularly in the Los Angeles area and in the Mid-Continent area.

Then in 2014, we were able to acquire the ARCO brand, and with that came a tremendous amount of very high-quality branded integrated volume. We have grown that to 155,000 barrels a day since then. Along with the ARCO acquisition, we were able to get rights and a franchise agreement to the ampm convenience markets. This is a very high-quality convenience market and we attached that to our ARCO stations to good avail, and we have over 600 sites where we use the ampm brand.

We have also expanded our Exxon and Mobil rights across nearly all of our geographies by now. And finally, just recently, in fourth quarter of 2015, we have been able to acquire 15 very high-value ARCO retail sites in southern California. So, very pleased about that.

So all of these things have been strong drivers of growth for our business, but we are not planning to stop there. From this strong foundation, we will continue to grow to reach this \$1 billion EBIT target -- EBITDA target by 2018 that we have been talking about.

So directing your attention to the bar chart at the right-hand side of this slide, you will have noted that a minute ago I talked about a target of -- or estimated earnings of \$900 million EBITDA for the marketing business in 2015. Well, we don't want to take credit for the market, as Greg talked about, and we like to look more at a normalized margin. So what we have done in this chart for the purposes of our planning, we have adjusted the 2015 earnings more to this 2016 -- 2016 margin environment that we see.

So that's at the \$650 million mark that you see in the bar chart. Building off of that, we plan to add about \$150 million to \$200 million of earnings from both organic growth and business improvement, and we're doing this through a series of things like investing in brand, store refurbishment, and significantly expanding again into this high-value branded channel of marketing.

Then on top of that, we plan to add between \$200 million and \$300 million of EBITDA by accelerating the growth well beyond what we are capable of doing through organic growth within that period through strategic acquisitions, and our acquisitions will focus on the high-value channels of branded retail and we will also significantly expand into the convenience markets and add convenience to many -- in many of our locations.

So the next several slides detail the plans behind this. In the first steps, we will start with business improvement so that we can maximize the value we get from our current asset set. We can look at business improvement in a couple different ways, first of all expanding volume, as well as the margin that we capture with the assets that we have. And some of the things that we are doing in order to achieve this is by getting top-tier

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designation -- it is a quality designation for our gasoline, so that our value customers who come to ARCO can now get high-quality gasoline for less.

We're also doing some significant work in refurbishing our sites, so that's what you see in the before and after pictures in this slide. Much of our -- much of the asset base that we purchased from ARCO was in a fairly old state, and so we have been refurbishing it to an exciting new offer and design that you can see in the lower right-hand corner.

This actually represents a substantial upside for us because still about 40% of our portfolio from ARCO is in the old format, so we will be busy upgrading that, and we are investing somewhere between \$60 million and \$75 million a year for these refurbishments and other improvements for margin, as well as brand.

Then the other side, of course, of business improvement is cost efficiency and that is not lost on us, so we're working on many different things, including an upgraded point-of-sale system and working with Lean Six Sigma to improve our maintenance practices.

Moving along to that organic growth momentum that I spoke about earlier, we have a lot of progress that we have planned in the area of organic growth, and the organic growth will build off of our very strong brands, including ARCO, Shell, Exxon, and Mobil. We have a plan in place to expand, in fact, our branded stations by about 550 by 2020 and that will bring in 42,000 barrels a day of additional high-quality branded volume.

Now the ways that we are doing this are twofold. First of all, we continue to invest in brands. We are investing in ARCO in some of the ways I described in the business improvement section, and the companies that we have branding agreements with, Shell and ExxonMobil, add tremendous value to our portfolio because they continue to invest in brand as well, and that's a huge value for us. So they are also investing in new station designs that are more modern and exciting. They're investing in exciting programs, like loyalty programs and point-of-sale systems where you can actually pay by your mobile phone. So these are all things that benefit us across our entire system.

The other way that we achieve this expanded organic growth is really through relationships, because it is relationships that earn those contracts with the dealers and the dealers have those high-value channels for dealer marketing -- or branded dealer marketing.

We have had a lot of success with this, so in the last couple of years, for example, about 50% of the expansion that I described that we achieved in the ARCO portfolio was really through dealers signing on to expand their portfolio with us. And another significant percentage of it were the existing dealers making recommendations to their friends and other business acquaintances to sign on with us. So, this relationship of doing what we say we're going to do, and in particular giving confidence that we are investing in the brand, enables us to achieve this organic growth at a high rate.

Now, moving beyond our base business and building upon the success that we have with those 600 ampm sites that I referred to earlier, we are planning to substantially enhance our convenience store position. So as I mentioned earlier, the way we maximize marketing margin capture is by getting closer and closer to the customer. Well, today's customers want convenience. Increasingly, they go to stores for their fuel that have convenience.

So we want to follow what the customers do, and we know that by doing this we can create an extremely high-value of integration in a highly integrated branded channel.

Let's walk through that just a little bit. Why is that? In the first place, because the consumers want convenience, it actually increases the amount of fuel that we sell per site. In addition to that, with a high-quality convenience offer we increase our diversified earnings stream by selling merchandise which tends to have a fairly high margin and it tends to be a very stable sort of business and source of income. So we can actually increase our nonfuel income as well as our fuel income by adding convenience, and those two things together increase our returns by site.

This is illustrated for you in the chart on the right-hand side. The bar chart that you see that says Tesoro current position is the average gross margin for the Tesoro portfolio on a site-by-site basis. So as you can see, we do actually earn nonfuel income at this point, but greater than 50% of what we earn is fuel and we have a fuel-focused portfolio.

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If we move to a convenience-focused portfolio on a site-by-site basis and if we apply the industry top quartile performance for strong convenience stores, what you can see happens is on a store-by-store basis our fuel margin increases and our nonfuel margin increases substantially, and those two things together can increase site returns by over 5%.

If you think about the leverage that this gives us in our overall portfolio, where we already have over 2,000 sites and we plan to grow substantially beyond that, this is a very significant growth proposition for us.

Now it is important to recognize that what we plan to do when we are growing in convenience is very, very similar to what we have with our multibrand strategy. We have a distinctive approach where we understand that by geography the customer's preferences for the convenience-store format and the things they are looking for actually vary quite widely.

So we are not going to have a one-size-fits-all approach in our convenience, but instead we will have a geographically focused approach so that we can serve our customers in a way that they see best, and that will enable us to maximize our profitability in convenience and fuel.

With this focus on convenience as a channel format of choice, we plan to build upon our base by a significant program of acquisitions and growth through acquisition, and the focus, as I mentioned earlier, of these acquisitions will be on branded retail so that we can maximize our integration with refining on a branded retail basis and capture that high marketing margin.

In some cases, we will exceed 100% integration, and that will help us bring in additional income by selling third-party product volumes in those regions.

As I mentioned, we will prioritize our acquisitions by looking at ones that have a strong convenience offer and we will be targeting what we look at, again, by geography so that we are picking the things that work the best and have the winning format in each of our geographical regions.

The results of this plan just over the next three years is to increase branded volumes by over 50% and our ultimate retail site count will be at about 3,800 within our plan. This whole effort adds about \$200 million of EBITDA to our overall system by 2018 within marketing.

So in summary, marketing is a very vital business that we have already transformed and we will plan to continue to grow it to this \$1 billion mark by 2018. When we do that, we will maintain the strong levels of integration that we already have, because this is very important to us within our strategy and within our strategic format. We will do it through organic growth, business improvement, significantly expanded convenience, and strategic acquisition, and it is probably not lost on you that this strategy actually works quite strongly in parallel with what you heard from logistics, which is also an engine for growth based on things like business improvement, organic growth, bringing in third-party income, which is a good analogy to the convenience-store diversification, as well as significant acquisitions.

So, once we achieve this plan in 2018, we will actually have created another platform for growth, and the reason for this is it is a known phenomenon that once you get a certain level of branded integration in a given region, the brand recognition actually fosters additional growth that can't be captured at lower scale, so we are planning on and we will get to that point by 2018.

The other thing that will enable us to continue to grow is we're moving much more into the customer-facing business, which will enable us to respond more rapidly to our customers' changing preferences and it will enable us to bring innovation into this system so that we can have more modern, more vibrant, more relevant formats as we go forward.

So overall, marketing will continue to grow. It will continue to contribute to our overall value chain and will bring in additional income diversified from nonfuel, as well as strong from fuel, and will continue to grow into the future.

So with that, I'm going to turn things over to Steven, who is going to pull everything together between all the plans you heard about growth between refining, logistics, and marketing into our financial overview. Steven?

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

The earnings growth we talked about today is going to deliver significant free cash flow. Our strategic financial priorities drive how we think about capital allocation and deployment of that cash flow into investment, returning cash to shareholders, and strengthening our balance sheet.

Our financial priorities have been consistent and enduring over the last five or six years and we continue to expect to apply the same discipline and financial priorities as we go forward.

It starts with the business improvements we have talked about today. Those business improvements drive significant Earnings growth, which also translates into high cash flow. In fact, if you look back over the past six years, we have generated \$5.1 billion of free cash flow, and if we look at the plan we laid out today, over the next three years we're going to generate about \$4 billion of additional free cash flow.

As we think about deployment of that cash, as I mentioned, three categories -- investment for return, return to shareholders, and strengthening the balance sheet. You can see our strategy here.

First, deployment to enhance return into investment. We target high-return capital investments in our logistics business at over 15% IRRs and in our refining business at over 20%, and that's all with the aim to continue to drive the total Company return on invested capital forward.

Second, we want to have a strong balance sheet. We are very committed to doing that, but doing it in a balanced way and by leveraging our growth to be able to do that, maintaining leverage at levels that allows us to execute our business strategy, pursue growth, but at the same time return cash to shareholders, which is the final leg. And in a moment, we will talk about how the business plans we have laid out today translate into shareholder value both in terms of portfolio, as well as capital deployment.

If you take a step back and look at the EBITDA progression of the Company since 2010, you saw earlier that we started at about \$550 million in 2010, and 2015 is on track to deliver \$3.9 billion. And if you go back to investor day last year, we talked about a \$3 billion EBITDA number for 2017. Today, we outlined our plans to get to \$3.5 billion to \$4 billion by 2018. If you think about this, that's similar levels to today's EBITDA, but as you can see on the chart on the bottom, it is in a much different market environment, as Greg outlined earlier in the morning.

What's different is we have got \$1.3 billion to \$1.8 billion of business improvements we have already identified that drive the earnings growth, and we get there in a very different way over the next two years.

I mentioned a moment ago that we have generated \$5.1 billion of free cash flow. This chart shows, if you look at the blue bar, that is the cumulative \$5.1 billion, but that's not the whole story because we have also created about \$2.3 billion in cash that has come from asset sales into our logistics business. So we have generated \$7.4 billion of cash available for investment.

Just to be very clear when we say free cash flow, this is cash after our operations and investing in all of our sustaining regulatory and maintenance and turnaround capital, so this is cash available for value creation.

We think it's very important to be transparent with our investors and be held accountable for how we deploy that cash. So if you look at the table on the right-hand side, these are the three categories I mentioned a moment ago -- investment, shareholder return, and the balance sheet. This is how we have deployed that cash over the last five, six years -- investment, \$1 billion in income capital, and to these high-return capital projects as I mentioned a moment ago.

Transformative and accretive acquisitions. You heard about several of those examples today, our Southern California refining and marketing business, the Rockies natural gas businesses, and others. And we also divested an underperforming asset in Hawaii.

We've done this, but we've also returned substantial cash to shareholders, taking a dividend that we didn't have a few years ago and growing it to about 2% yield. We paid out about \$500 million in dividends. Our approach to dividends is to continue to grow dividends commensurate with the growth of the Company. So it's about dividend growth.

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But it's also about repurchasing shares. We deployed this cash there as well. We've repurchased 17% of our shares since 2010. And you heard from Phil about the growth in distributions from the growth in our logistics business.

And finally, if you take a step back, we have been able to grow the business, return capital to shareholders, position ourselves for growth going forward. And we have also been able to strengthen the balance sheet as we've done that by reducing our leverage by about \$1 billion, net leverage, over this period of time.

This all needs to translate, as I said a moment ago, into high returns on invested capital. This chart, the blue shows Tesoro's return on invested capital. The yellow shows our peers. If you look at the left-hand side, back in 2010 and 2011 we had a 400 to 600 basis point gap that we started with on return on invested capital versus our peers. If you look at the far right, you can see in 2014 we were 200 basis points. We closed that gap down to 200 basis points. And this year, we are about 200 basis points above. Some of that is market, as we talked before, but the whole industry is seeing some of that.

How we've done that, the formula that we have applied to drive returns is what we have been talking about today. It really comes down to the essence of our business improvement projects, being disciplined and investing in high-return capital projects, the accretive acquisitions that we have been able to execute on and create synergy from, and, finally, the logistics and marketing growth that have contributed to this substantially.

One thing I'll point out, if you look -- in 2013, there was two significant additions to our peer group. So the peer comparisons were adjusted starting in 2013 to reflect this broader industry peer group. So you have got an even more robust comparison as we go forward.

And as we look forward, the plans that we laid out today are projected to deliver \$4.8 billion of cumulative cash flow over this period of time. I mentioned earlier that there's about \$4 billion coming from business operations. There's also an expected \$850 million expected from asset sales of TLP. So we do expect to be able to execute the growth plans Phil laid out, continue to grow distributions in the logistics business, but also be able to return cash to Tesoro shareholders through asset drop-downs.

I'll also point out that our cumulative cash generation is not back-end loaded. You can see in 2016 we expect \$1.4 billion, and that's pretty ratable as you move through the plan.

As you move down the page, the first bucket category we talked about of deploying capital is high-return investments. I mentioned that we spent about \$1 billion in these investments over the last six years. In the plan we laid out today, there's about \$1.1 billion of income capital investments. High return -- these are the projects Keith mentioned earlier that, by the end of 2018, deliver \$350 million of EBITDA.

Second, we expect to deploy cash, continue to grow dividends, return cash to shareholders in the form of share repurchases, and maintain a strong balance sheet. So the principles that we have applied historically, we continue to live by those and expect to deploy cash that way going forward.

We also want to maintain a very strong balance sheet, for two reasons. First, we think it's critical for the long-term sustainability through all business cycles. Second, equally important, we want to have the balance sheet ready to be able to continue to grow the business, make investments that we've talked about today. And we believe we can do that and achieve an investment-grade rating based upon the improvements we've made in the business, the earnings growth, our capital deployment strategies. And we think we have already been operating that way.

And so, the way that we think about capital allocation and capital deployment are consistent with how we think about it going forward. So the rating doesn't change it because we have already been operating this way, and our metrics show that.

There's three key benefits that come from that. Obviously, lower cost of debt over time; financial flexibility, which is critical for us; as well as improved access to markets. In terms of cost, 150 to 200 basis points is in the range of historical. That's about \$100 million for Tesoro.

Second and equally important, though, is our ability to extend debt maturities, particularly within our MLP. To fund the growth of our logistics business, access to the debt capital markets is very important. And as we look at being able to be investment grade, it provides longer maturities, as well as the lower cost of capital. So we feel that that's important to help match the quality of our logistics business growth profile.

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So we just talked about our financial strategic priorities, how cash gets deployed to create value. And now, we want to transition into how our business plans come together in our portfolio and how we think that positions shareholders to have an opportunity as we move forward with this plan.

We shared earlier 2010 EBITDA was about \$550 million, principally driven by refining operations. Fast forward to 2015. Through the improvements that have been made, we've got a much more balanced portfolio, a very strong marketing business and growing marketing business, a logistics business that's on track to deliver \$1 billion by 2017. And then you move forward into our 2018 plans, and we believe that the integrated nature of our portfolio and the fact that each of these businesses have improvement opportunities, so we are not growing one business at the sake of another; we have growth across all three. We are strengthening all three of these business and it positions us well to create additional value.

We've demonstrated that in our logistics business. So in April, we are going to come up on five years since the IPO. And I wanted to reflect back upon how that has created value for Tesoro shareholders. There's three or four key areas. One, I mentioned that we've generated \$2.3 billion of cash from asset drop-downs. And that's going to continue through the next three years.

Second, we are now in the high splits on our general partner ownership. If you look at the top left chart, our general partner distributions are beginning to grow exponentially. And in fact, if you think about the growth plan Phil laid out for you today, 50% of that accretes to Tesoro shareholders through our GP ownership.

In addition, on the bottom left, we've continued to maintain sponsorship and investment in the LP units. We own about 35% of the LP, so we participate in 35% of the LP distributions as well. So in addition to the quality business that we've built, we've got a strong financial connection to the MLP. And we believe that that has translated into very strong shareholder value creation for Tesoro shareholders.

But if you step back and think about the whole portfolio, we think that there's additional opportunities for us to continue to create value. Obviously, you can look at the right-hand side of the chart and think about how to value the business.

But I'll share with you how we think about it every day. Folks talk about the refining industry as being a mature business. The manufacturing process is relatively mature, although we continue to make substantial improvements. But the business model of the integrated, strong refining asset built around strong logistics assets and marketing capability, we believe, is a new business model that's beginning to deliver the returns that it should.

And as we look at that and we think about growth within each of the businesses, the refining business -- very robust, high returns, strong base of assets. Our marketing business, we continue to invest for growth. We have organic opportunities. But we also mentioned acquisition today. We are very cognizant that the cost of capital for each of these businesses is different, refining versus marketing, marketing versus logistics. So as we think about investment for growth and we think about capital allocation, we remain committed to the capital allocation principles we laid out. And we will look at all sources of capital and appropriate sources of capital to fund our growth.

Finally, we covered the logistics value proposition. We continue to build upon what we've done.

In summary, everything we've talked about today needs to translate into shareholder value creation. Our commitment is to not just provide returns, but to provide superior returns to shareholders. We've done that historically. You can see that on the right. But the principles we've laid out today and the plans, we believe the business improvement efforts create distinctive value for Tesoro and that we will continue to have a balanced approach to capital deployment, investing in the business to make it stronger, returning cash to shareholders and having a strong balance sheet, and growing the dividend and repurchasing shares.

So with that, I'd like to ask Greg to come back up for closing remarks, then we will get to question and answer.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

When I listen to it all, I just walk away with one word. And that's our ability to execute. To us, it's really about execution. And one of the points I wanted to make at the very beginning was about the type of Company we are. And we have worked hard to build that capability to execute the business.

So we laid out a fairly ambitious plan today. In refining, Keith talked about what we are up to in refining. Phil talked about logistics; CJ, marketing; Steven, the financial overview of the Company. But when you take a step back, it's all about our ability to execute. And I personally am incredibly confident, partly because of the caliber of the people that I work with, that we can execute the business, but because we can see the opportunities that we are pursuing.

So I'd just like to just take a couple seconds here and just summarize those things as we talked about them. When you take a look at what we see from what we call business improvement, we targeted that \$900 million to \$1.1 billion of improvements based upon our forecast of margins for 2016.

And we said that is comprised of two pieces. The one piece is our traditional driving improvements in the business, which we said is about \$400 million to \$500 million. And then, based upon events that happened in 2015 not reoccurring in 2016, we see that \$500 million to \$600 million of improvement there. So we feel very, very confident in our ability to do that.

We talked about growing the logistics. And we -- our track record, I think, speaks for itself. The unique thing about what we've focused on in logistics is the integration in with Tesoro. So even -- take, for example, the example that Phil shared with you around the acquisition that we just announced yesterday. We talk a lot about those things from a logistics standpoint.

But what that really does is it enhances our position in the Bakken to source crude oil for our refining system so that we can -- because we need to capture advantages. The advantages aren't \$1 or \$2; it's \$0.25 here, \$0.50 there by how we go out and do that. So the value there is extremely important. And we see great opportunities to continue to drive that strong integration between logistics and the rest of our businesses.

And then finally, which is really a step change in how we want to go about the marketing business, as CJ talked about, we have made improvements in the marketing business over time. You've seen the number of growth in our outlets in that. We've been operating improvements that show up and account for some of the enhancement in profitability this year.

But when you take a -- how CJ reset the business and said this is where we start from next year, and from there we target to get to over \$1 billion, there's a lot of things that have to happen there. But they are actually pretty exciting things, but in a very difficult market. We can't deny that going out and to do the things we want to do, they are not going to be easy. But we believe, because we have a very targeted approach in each geographic area and region, that we will be able to go out and, over that period of time, deliver and get that marketing business there.

So when you pull it all together, I personally like that portfolio, that transition, those three pie charts that Steven showed you, from where we started from and by 2018 to get that 45%/25%/30% portfolio and the income that comes out of that positions us extremely well to have a very strong Company.

So we thank you for taking the time to listen to us. I think that's important. You have to hear -- you have to listen to what we have to say because we are very proud of that.

And now, what I'd like to be able to do is just start to ask questions. So I'd like to ask Keith and CJ and Phil to come up here, and between the five of us, we will answer questions. Doug? I guess -- well, let Sam help facilitate this.

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**Sam Ramraj** - Tesoro Corporation - VP IR

I just want to remind everyone (technical difficulty) get you a microphone so you can be heard -- your questions can be heard on the webcast.

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### QUESTIONS AND ANSWERS

**Ryan Todd** - *Deutsche Bank - Analyst*

Ryan Todd, Deutsche Bank. Maybe if I could, a couple of quick questions, one on the marketing business. How should we think about -- given the near-term focus on acquisitions and growth in the marketing business and the targeted \$1 billion by 2018, how should we think about long-term value within the organization in terms of internally to Tesoro versus potential monetization in the market? And how do you think about creating value internally versus externally there? And then, I have one other.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

I think the first thing that's really important to start the answer to your question is we have to focus on the business, what we have today and, more importantly, what CJ laid out and what we are going to be able to do because when we are successful in doing that, that creates an incredible amount of value.

But part of that does require a fair amount of capital. We didn't talk about the amount of capital that it takes. CJ laid out a couple hundred million dollars of income, and you can do the math yourself to see that -- to successfully do that is going to take some capital.

So it's our intentions as we move forward and identify those opportunities, just like Steven said, we will determine what is the best and effective way of sourcing capital to do those acquisitions. And we think we have a number of opportunities to do that. But today is not the time to answer that because we are very focused on what we are trying to do, and we will address that as we move forward

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**Ryan Todd** - *Deutsche Bank - Analyst*

Okay, thanks. And then maybe one follow-up on assumptions in here in terms of proceeds from drops and the way maybe the drop structure has changed going forward. If I'm looking at the numbers correctly, are the right assumptions on future drops to TLP, you are assuming a 50% cash split at a multiple that's around 7.5 times? Is that the right way to look at these in terms of trends on multiple and cash versus unit splits going forward?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes. Steven, do you want to comment on that?

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

Yes. I think the first part of your question, the answer is yes. We do think about a guideline of about 50%. That can vary, depending on the type of drop and what's going on within the business.

Second, I think a better range, if you just look at historical comparables, is probably closer, more in the 8 to 10 range. But it really depends on the asset. Some assets will be at the lower end of the range. Some could be above that end of the range.

So there's not -- because of the way Phil described our drop-down portfolio, it's not just a whole series of tanks and terminals. They are very, very different business assets. They all have unique value. So I think if you want to use a planning assumption, 8 to 10 is not a bad macro range. But we will talk about each one uniquely.

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**Ryan Todd** - *Deutsche Bank - Analyst*

Thanks.

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**Doug Leggate** - *BofA Merrill Lynch - Analyst*

Greg, thanks for all the information this morning (technical difficulty). Doug Leggate, Bank of America. Just a follow-up on the retail business because \$1 billion gets you to a pretty robust standalone business --

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Absolutely.

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**Doug Leggate** - *BofA Merrill Lynch - Analyst*

-- that trades at a substantial multiple if you look at public comps relative to where you guys are. Is there a point in the future where you see retail becoming a standalone entity or at least a publicly traded entity as a way of releasing value? And just to pin you down a little bit, should we think of 8 to 10 times as a good multiple on the EBITDA that you are looking to achieve as well, in terms of acquisition costs?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

I think what's important, Doug, on our marketing businesses is that as we evaluated our current position, we see substantial opportunity to drive improvements in it.

So if someone were to value our marketing business on a comparable standalone basis, we would probably be more towards the lower end of that range, primarily because of CJ's comments about a weaker convenience store op than the stronger companies that would trade up there. So that's why we see that as a very important opportunity to be able to go in and drive that. And doing that successfully should move us to a more premium business and closer to that higher part of the multiple.

Our Company is a highly integrated business. So how all of those pieces fit together, everything we talked about today, that has to be one of the most important things. When you look at how our acquisition of feedstocks, through the logistics system, through the refineries, through the logistics system out into the different marketing channels we go, that integrated value -- there's a lot of synergistic value there for the Company.

It's probably not very likely that we would ever spin off our marketing business, but we can look at ways to raise capital to get the most effective cost of capital, like Steven said, when we start to grow the business.

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**Doug Leggate** - *BofA Merrill Lynch - Analyst*

I appreciate the answer. On the acquisition scale, 8 to 10 times is an acquisition?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

We look at the marketing business and think that we can find opportunities where it's probably going to -- the returns are going to be in the 12% to 15% rate of return. So you can do the math from there.

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**Doug Leggate** - *BofA Merrill Lynch - Analyst*

Thanks. My follow-up is really just on the Bakken differentials and the west coast strategy. Just order of magnitude, where things stand today, do the economics as you think about it still work?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

From Bakken to the west coast, there's a couple things that have -- there's one thing that hasn't changed. And the yield advantage that we get off of Bakken in our west coast system has stayed the same. So we still get that \$3 to \$5, as [Danny] said, we've talked about now since we started moving Bakken to the west coast. That is still there.

The other thing is that we are starting to see the cost to move that change to get to the west coast. The short-term differentials on Bakken, they have been pretty tight this year, for a number of reasons. But we still see that, over time, because of the advantages of getting the lowest cost to get to the west coast, as well as the yield advantage, we see economic value to move it there. But it's not as great as when the Bakken differentials were blown out, that's for sure.

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

And the economics that we laid out today for Vancouver Energy are contemporary with those views of the market.

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**Sam Ramraj** - *Tesoro Corporation - VP IR*

Phil?

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**Phil Gresh** - *JPMorgan - Analyst*

Thanks for all the color again today. We really appreciate it. My first question was just looking at the sources and uses of cash moving forward. You talked about \$3.7 billion of excess cash flow. If I think about a dividend of maybe, cumulatively, \$800 million, the multiples Doug was referencing on the retail M&A front, it would imply that there isn't a lot left over for buybacks. You didn't really discuss a lot about buybacks, but should we interpret that given where your balance sheet is, that the retail strategy is one where you are going to use more leverage to get there and that you are going to commit to the same amount of buybacks you've been doing over time?

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

Yes. I think, to be clear, the point I was making about our capital allocation principles consistently applied, and the concept of marketing, looking at all potential sources of funding, not necessarily funded out of free cash flow. It could have some modest amounts, but not material.

And so, we think about those funding separately from the capital allocation principles to fund that growth. So I wouldn't necessarily do the math the way you did it. I would think that there's optionality to that. But that's not the principle. It's not consistent with the overall principles that we laid out today. It's to find the most appropriate allocation of capital.

So share repurchases, we continue to repurchase shares. We've got about \$1.5 billion outstanding on our authorization as of the end of last quarter. So it's still a very important part of the overall return of cash to shareholders.

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**Phil Gresh** - *JPMorgan - Analyst*

Okay, thanks. That's helpful. My final question is just on the LA integration project and I just want to get an update on where we stand on the approval process. I think the target, if I recall from last year, is hopefully to get it by the end of this year. So I just want to get the latest status.

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**Keith Casey** - *Tesoro Corporation - EVP Operations*

That's correct. So we've submitted all the information and it should go public comment at any point now for the permit. So we are very optimistic that we'll -- nothing we can see today would change our belief that we are going to be well in position to begin construction next year.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes, this is a project that reduces CO2 by over 300,000 metric tonnes a year. Besides the impact that it has on the Company with everything that Keith talked about earlier, it has a very positive impact on the environment.

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**Sam Ramraj** - *Tesoro Corporation - VP IR*

Paul?

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**Paul Sankey** - *Wolfe Research - Analyst*

Thanks. Is this working? Hello? Greg, if I could just go back over a few of the growth elements of the expansion story in a single question, in three parts, but one which grows in its expansiveness. Firstly on marketing, I was just wondering if you had a volume growth in terms of gasoline demand and overall market. I know that you've done a consistent job of saying we are not expecting anything from margins. But I just wondered if you were looking for market expansion in the US and whether you could expand on the geography that you intend to grow.

And as I see, you've moved further east. And I think I misheard, but there was something about branded and unbranded acquisitions. I didn't know whether you were saying you would buy branded or unbranded. That's part one.

On logistics, it seems that we've obviously got a lot of news flow around Kinder and Plains and others who are exposed to the oil market who are really almost throwing in the towel. You are in areas where, clearly, activity is being affected. But you are reiterating a pretty powerful growth story. Can you just talk more about that, please? Thank you.

And then, finally, on refining, I just wondered the extent to which you seem to have a fairly low CapEx with quite a high growth in EBITDA. And if you could just talk a little bit more about it. I know you have attempted to go through that. How dependent is some of that on the CapEx plans that you've got? And very specifically, I wondered how dependent on the Vancouver projects. And apologies for a long laundry list. But that's it.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes. So maybe easiest to start with the last question and work our way backwards, because that's the only one I can remember.

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**Paul Sankey** - *Wolfe Research - Analyst*

I can repeat them.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

No. Seriously, in refining, Paul, let me just make sure I understand your question. Was your question about the amount of money we are investing into EBITDA that's attributable to those projects?

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**Paul Sankey** - Wolfe Research - Analyst

Somewhat, yes. I know you've attempted to answer this question already, obviously, through your presentation. But I just wanted to run back over it. It is a very important part of what you are doing and I just wanted more of an idea of where this EBITDA is going to come from, given that you are coming off a high-margin environment.

You are saying that you strip that out, but we still see tremendous growth. As an example, you've got very high utilization.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Right.

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**Paul Sankey** - Wolfe Research - Analyst

And it seems that there's not a huge amount of upside there. Anything to add, essentially, would just be interesting at a high level.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Yes. So on the projects, we have a little bit less than \$1 billion of spend for the projects that Keith laid out. So our spend is about -- a little bit less than \$1 billion. And some of that we spend on engineering work, but we will spend between now and over the next three years.

And the combined impact of all those is about the \$350 million, part of which is some of the value that we capture from Vancouver Energy from a supply standpoint. So if you recall on the slide that Keith showed on Vancouver Energy, it showed a couple hundred million dollars of income, part supply and part of it is logistics. But the logistics part is nowhere near as robust as it was when we first came up with this idea a couple of years ago.

So those projects and the income, they are all highly attractive. If you listen to how Keith described them, they have very important strategic implications to the Company because of the flexibility to go between gasoline and diesel, the ability to create competition between Bakken and AF crude differentials and a number of those things in there. So that, I think, we feel very, very [calm] about.

The EBITDA from refining, I think in general, just the base operations that are -- I think Keith showed you this year and you rightly pointed out that the margins have been very strong this year -- and absolutely, it's true -- that we see that -- in that year, I think refining makes about \$2.6 billion of EBITDA. Well, in a lower-margin environment, it's not going to be able to make that.

But what we do see is we have run it the 97% utilization. So we are very comfortable there, with what we have going on, that we can get to that 97% utilization because of what happened this year. We are -- one event was completely outside of our control. So we feel comfortable that the EBITDA from refining, based upon those numbers, gets you up over \$2 billion of EBITDA from refining, which fully supports the cash you need to reinvest back into the refining business. So that's on refining. Was there any --

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**Paul Sankey** - *Wolfe Research - Analyst*

Part two was the logistics, the sort of (multiple speakers) the wider environment of sort of decline in the US. We were with Murphy Oil last night. They cut CapEx by 10% for next year (multiple speakers)

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

But your question on refining, did I fully answer your question?

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**Paul Sankey** - *Wolfe Research - Analyst*

Yes, that's fine. I think within the limits of what time we've got, yes (multiple speakers)

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So the second thing, on logistics, I think one thing about logistics -- in a way, we are a niche company. You don't see us going out and putting in a \$5 billion pipeline. We are not making those big type of things. So even though we are very focused in our region, we are a niche logistics company.

We are integrated in with Tesoro's value chain. And the opportunities that Phil pointed out, specific examples of things that we are doing to go in and work with producers, or, on the other end of it, to be able to tie in those projects, but in a way they are niche projects.

So there's a lot of them. A lot of them are smaller projects. Our biggest logistics project that we've ever done is \$150 million. We just finished it this year. And the portfolio of things that Phil showed in the capital spend, they are circa -- some of them, the largest ones, are only \$100 million.

So I think you need to keep it in perspective when you compare us to some of those other -- we are not driven by the same things that they are. We need the growth and there's no question that the lower crude oil environment and natural gas environment for prices has an impact. But because of how we position ourselves, we feel we can capture those niche plays.

And more importantly, we are working on things to venture out into Powder River, into Niobrara and that. But they are more niche plays; they are not big moves like those other companies. That's from logistics.

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**Paul Sankey** - *Wolfe Research - Analyst*

Understood. And then the final one, if you recall, was just marketing.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Marketing.

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**Paul Sankey** - *Wolfe Research - Analyst*

Yes. Thank you all.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So in marketing, the growth in marketing -- maybe you better ask that question one more time, just so I don't --

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**Paul Sankey** - *Wolfe Research - Analyst*

(inaudible - microphone inaccessible)?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So the growth in gasoline demand we see being less than 1%, so we are not very bullish on gasoline demand growth. Although in our geographic area, particularly California, there has been over the last few years pretty robust demand growth.

As we look forward, we see it below 1% and over time flattening out. So we don't see our growth coming from growth that's a result of demand increases. That's the one thing.

Our marketing strategy, which CJ pointed out is very regionally focused, it's driven by how we integrate in with refining because we want that connection. It's almost a physical connection. So we are not source and marketing that we are trading into a different area. We're almost physically integrating those marketing assets in with refiners so that we can get those value benefits across there.

And each region is different. Each of our regions are different. So California is very much a gasoline-driven marketing business. And the convenience store is not as important as it is in other regions, which are very much convenience store and then they sell gasoline.

So we -- one of CJ's points that she tried to make is we need to target the market that way, and the unbranded business, they definitely play a role in what we're trying to do.

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**Ed Westlake** - *Credit Suisse - Analyst*

Ed Westlake, Credit Suisse. Still sticking with logistics on slide 46, you have something like \$1.5 billion to \$1.6 billion of CapEx for \$235 million to \$300 million of growth EBITDA. Those are relatively low multiples or high returns. So can you talk through how much of that is already fee based, you are talking with customers? And just maybe a general concept as to why you think you can deliver lower investment multiples and more attractive investment multiples than the industry average?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Phil, do you want to answer that?

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**Phil Anderson** - *Tesoro Corporation - President Tesoro Logistics GP, LLC*

Sure. Ed, I think part of that is the CapEx spend in 2018 probably doesn't deliver EBITDA until 2019. So you've got a little bit of timing issues in there.

I think overall we see our typical returns, 15% to 20%, being pretty stable across the system.

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

Yes. The principal model, too, in those investments is a fee-based model. So consistent -- and if you look back over the last three years, as Phil said, we've had -- and that's what we have emphasized organic growth because they have been about 5 to 6 times multiples versus a drop, which could be higher in acquisition. That's why the strategy, as Greg mentioned, being niche focused, is really around the organic opportunities where we can bring unique value and get paid for it.

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**Ed Westlake** - *Credit Suisse - Analyst*

I guess folks might just be surprised at how attractive that investment is relative to the stress in the upstream, which is the part of my second question, which is counterparty risk across your third-party business, maybe any color as to how much is sub investment grade in terms of the suppliers to your business versus investment grade. I don't know if you've done any analysis around --

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes, we have.

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

We have. We have very strong customers. If you look at who we deal with in the Bakken, first off, it tends to be customers that Tesoro deals with in its overall crude business. So it's typically the larger independents and the majors.

And in the Rocky Mountains, it's a utility. The one smaller independent we deal with is very well capitalized. And everybody else, again it's majors and large independents. So we actually have a very strong customer base.

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**Ed Westlake** - *Credit Suisse - Analyst*

And then, this final one is a softball for Greg. You mentioned 25% optimization benefits, I think, in your opening remarks. And then, you said we would get a sense of how much was included in the business plan. I guess I have to do some math, but how much upside is there to this business plan if you execute on that 25% number?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes, Ed, and let me just be very clear about my point there.

From my personal experience in the industry, I believe that when you are very good at optimizing along that value chain, you can enhance your earnings by about 20% to 25%. And what I said was we capture some of that today. So we believe that there is upside. So we have an effort going on in the Company where we are looking at each of our regions and looking at how we optimize those value chains. And we haven't built those into our plans, actually.

But we started that about midyear this year and we are developing how the people work together to capture those optimizations. Just from my own experience and what I used to do, I think it's possible to be able to do that. We capture some of that today through what we call capture. But it's not built into our plans and as so.

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**Unidentified Audience Member**

Greg, a couple quick questions here, plus one comment. The first comment is I want to thank you for this slide showing the benefit of getting to investment grade and how you would be able to extend the maturities. I think that was a good slide.

As a follow-up to the concept of the typical range for asset drop-downs to the MLPs, that could be 8 to 10 range, but every asset has to be looked at separately. Just out of curiosity, I look at the Vancouver Energy project. And I don't know if it's 80/20, 50/50. But even if it was 100%, you are talking about a 2X type of a project. At the low end, it's 400% return to the parent. I know this is really for the battle of the committees to figure out what a fair value would be.

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But on something that has such a quick payback and a low multiple initially for operations, would that still typically fall in an 8 to 10 range? Or would that be underneath that low end, do you think, when the committees came out behind closed doors?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

It's actually probably too early to judge that. I think we have a lot more work to do on how that comes about. That market is changing quite a bit on what the rates are on that. I think we are seeing it up in, say, North Dakota. So on the loading end of it, one of the things that we just did is we bought an asset that will change our cost to load the crude oil. So we will have to work our way through those. We see different rates. And it's probably just premature to comment on that.

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**Unidentified Audience Member**

Okay. And then, I guess, the other question, and maybe it's just a clarification to me, is the benefits that you saw in 2015 you said are going to come back down for Tesoro are still going to go up because of one-off items in 2015 that won't repeat. Were those basically situations that improved your margins so the volumes will stay steady, so to the extent that there's flow and payments to the MLP for utilization, that should stay pretty stable? Or will there be an impact to the MLP by that coming down as well?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

There will probably be impact to the MLP. That was impacted slightly by the results in the refining business, so there will be some slight impact. We haven't called that out of what that would be, but it would be slightly an improvement for the MLP business.

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**Unidentified Audience Member**

Okay. Great. Thank you.

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**Sam Ramraj** - *Tesoro Corporation - VP IR*

Paul.

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**Paul Cheng** - *Barclays Capital - Analyst*

I think I have two questions. One is for CJ and one probably for Steven. CJ, over the last 15 years, as far as I can remember, going into convenience-store business is really the strategy for every single refiner in that business. But quite frankly, no one seems to be very successful. The only guy that has been successful is probably Speedway.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Right.

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**Paul Cheng** - *Barclays Capital - Analyst*

So the real question is that why you believe you will be able to (inaudible) and how that you are structured differently than everyone else as to make you believe that. And also, do you really already have the right people? That's my first question.

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Second question is for Steven. In the press release that you sent out this morning, the cash flow from operations you cite for the next two years, 2016-2017, [quoted] roughly \$1.8 billion, \$1.9 billion. If I look at the total CapEx including the growth capital, it's about in the \$1.6 billion, on average. Your dividend is about \$200 million. And distribution to the minority unitholders in the TLLP is probably another \$200 million to \$300 million. So that means that [after audits] those actually have no free cash flow.

So should we look at it and assume the share buyback will be a function of how much you can do to drop down and actually get the cash? In other words, that depends on the capital market being open for the TLLP? Thank you.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

CJ, why don't we address marketing first?

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**CJ Warner** - Tesoro Corporation - EVP Strategy & Business Development

Be glad to. So in a way what you outlined is an advantage for us in that we have a lot of good examples of what doesn't work. And there are some good examples of what does work.

So going into convenience just to go into convenience and not picking the winning format and not really having the capability to make convenience work is a good way to not be successful. But there are some good, successful models out there. There are some very successful convenience formats. And there are winning formats by geography. And all those things are what we have in our sites and what we will be using in our forward approach.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

I think one thing that's important to add to what CJ said, Paul, is that we already have those sites, that we are not going out to create those. So we can take how it performs today, and if we get to the target that CJ laid, that says that we can improve the internal rate of return on those investments by about 5%. So that's the direction we need to get there.

But your point is about who does that well. I think you are right. If you look at the best convenience-store operators, they are private companies. It has been that way for a long period of time. And so, we will learn from that and be able to go in and make substantial improvements in what we do today to get that benefit.

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**CJ Warner** - Tesoro Corporation - EVP Strategy & Business Development

One of the things that may not have been clear from what I was talking about is that the convenience and fuel format (inaudible) fuel-led format that has convenience attached to it or it can be a convenience-led format that adds fuel. And it's the convenience-led formats that we are looking at and that we see are more successful.

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

And on the cash flow question, if you look at page 68 in the presentation, 2018, the cumulative cash flow over the plan period is \$4.8 billion.

And just to be real clear, that's already after all maintenance, regulatory, and sustaining capital. Okay? So you take the \$4.8 billion and you look at the growth capital, and you can subtract that, about \$1.1 billion, which gives you \$3.7 billion of cash available to deploy.

And so you said dividends. If you think about roughly \$800 million over three years, that leaves \$2.9 billion of cash available for further investment, share repurchase, et cetera. So I think you may have taken out regulatory and sustaining capital from those numbers that are already deducted from there. If there's any questions, we could follow up with you specifically.

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**Chi Chow** - *Tudor, Pickering, Holt & Co. - Analyst*

Chi Chow, Tudor, Pickering, Holt. I don't see a slide in the deck on this, and maybe it's in your email you sent out this morning. But can you summarize the capital program for both a TSO standalone and TLLP for 2015 through 2018?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

It might be piecemeal in here, but it would be helpful to get some sort of summary on just --.

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**Keith Casey** - *Tesoro Corporation - EVP Operations*

(inaudible) is on 27, Greg.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So on page 27 -- I don't know if somebody can click those slides back there to page 27. That would be good. So, Chi, in 2016 you can see that our sustaining capital is about \$400 million, for refining. So that's what we would call regulatory and maintenance capital. And then you can see what it does over the 2017 and 2018 period of time. From an income capital -- is that in the backup, Steven?

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

That's the \$1 billion.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So over the cumulative impact -- so in 2016 there's \$400 million; \$430 million -- it's on page 68, \$430 million. Then it grows to \$1 billion --

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

That's cumulative. So there's \$530 million --

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

-- by 2018.

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

\$530 million in 2017.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes. And then a little bit in 2018, about \$100 million is all. So that's for Tesoro.

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

And also, if you look at the press release, we've got a table that shows, each year -- regulatory, maintenance capital, as well -- that could walk you through that.

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**Chi Chow** - Tudor, Pickering, Holt & Co. - Analyst

In the emails -- so just to clarify, the total TSO is TSO standalone?

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

Yes.

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**Chi Chow** - Tudor, Pickering, Holt & Co. - Analyst

Okay.

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

Yes.

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**Chi Chow** - Tudor, Pickering, Holt & Co. - Analyst

Okay. And then a question on the gasoline market -- can you talk about the sustainability of this octane premium that we've seen this year? What is your thoughts on that? And are you thinking about allocating capital to capture the arbitrage from what we've seen?

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Keith, do you want to respond to that?

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**Keith Casey** - Tesoro Corporation - EVP Operations

Yes. So as Gregg said, we don't see a tremendous upside, but we do see some sustainability there. And that will be important because if you think foundationally why is that occurring, as manufacturers work to produce tier 3 gasoline, which further reduces the sulfur content of the gasoline, that typically has an octane associated penalty. So that is going to drive some of the value of our octane up over the market. And our strategy with the isomerization project is we are taking that into synergy to reduce the overall octane cost. So we think that's going to be pretty durable. And we will continue it in the future.

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**Chi Chow** - Tudor, Pickering, Holt & Co. - Analyst

With the xylene project, you are taking high-octane out of the market. And if you look at those economics today, it just seems like that would be a negative margin. So does that project still make sense, long-term?

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**Keith Casey** - Tesoro Corporation - EVP Operations

Yes. It's a great question. When you look at it, so we are -- the reformers that produce the octane and also the xylene molecules -- they are running at a bit lower utilization today in the US. And there's a combination of factors because of that. One of the byproducts is hydrogen off those units. And with natural gas, there's less economics.

So expanding and running those reformers to full rates, we will be able to extract that xylenes molecule, and we will still be able to have the octane benefit coming from that. And then we clean up the naphtha streams through our naphtha optimization and produce more octane through the isomerization.

So, net-net, it's that synergistic effect. So those two slides we were talking about, the cleaning products upgrade project really gives you that capability to do both. And then through our network on the West Coast with the three large refinery positions, we are able to bring those naphthas into extraction to gain the most margin.

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**Evan Calio** - Morgan Stanley - Analyst

Evan Calio, Morgan Stanley. Your concluding slide, on 75, you show your implicit goal of capturing a higher multiple. Right? And you even talk about methods of forcing that valuation in the marketplace via other monetizations. And as in 2018, refining's a minority of your EBITDA, as kind of an across-the-industry trend.

So the question is, with that goal in mind, does that color or drive or change your appetite on refining acquisitions? Is everything -- is your M&A strategy going to be focused in the same direction of driving the higher-multiple businesses? And I have a follow-up.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Yes. Our growth, Evan, to grow the Company, what we have tried to lay out today specifically in logistics and marketing, I believe, is very targeted on what we are trying to do in those two parts of the business. But we have always had a strategy in our strategic parties -- we call it value-driven growth. We've always looked for opportunities on how we can grow the value of the Company that's really highly accretive to the owners of the Company.

If we find opportunities from an M&A standpoint, we would look for opportunities that are -- they fit our business model, they are in our geographic area, and they provide significant advantage for us to be able to capture -- whatever you want to call it -- synergies and improvements in the business by the way that we would run that business. But it's not driven as much by the multiples that we show there. Those are just the facts of how the business has traded. But our focus, if we were to be able to pursue an opportunity, would be driven by those factors around what I just said.

So the purpose of slide 75, which is to say we've worked to get this portfolio from where it was in 2010 to where it is today, and where we want to take it by 2015 because of everything we talked about today -- by 2018, excuse me -- and if by doing that, and we get the EBITDA up to that level that we've targeted there, and where the businesses trade today, that's how the business would be valued.

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**Evan Calio** - Morgan Stanley - Analyst

Great. That is very clear. And my second is, as you look into 2016, are you willing to continue to absorb the growth of the midstream by taking units versus potentially decelerating growth in what is a very uncertain US commodity outlook? But given also what's implicit in growth assumptions within those vehicles.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes. Steven, do you want to respond?

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**Steven Sterin** - *Tesoro Corporation - EVP, CFO*

Yes. As we look at the project that we've got today, Phil mentioned as we look at 2016, a lot of the growth is driven by projects that are either complete, nearing completion, or committed. So we feel very good about the growth plans we have for next year.

In addition, the capital allocation strategy for TLP -- as somebody mentioned earlier -- the plan that is in here today is about 50/50, with Tesoro taking some equity but also continuing to monetize. So we still think it's important to be able to do both. But we want to think about the long-term sustainability of the business.

So we are not going to compromise if there are short-term negative market fundamentals to do something that doesn't make sense. But generally, that's how we think about the approach. And that's how we feel comfortable today that that's our plan for next year is to continue to have 50% cash coming to Tesoro, and about 50% equity.

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**Jeff Dietert** - *Simmons & Company - Analyst*

Jeff Dietert, Simmons and Company. Greg, you highlighted execution as one of the key aspects. And I wondered, within the refining segment, you've got four major projects that are coming on in a relatively tight time frame. So they are going through permitting, engineering, construction, and bringing it into service in a relatively tight time frame.

How do you manage strains on the organization? What are some of the critical path items for those major projects that are targets you need to hit? And maybe focus here in 2016.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Excellent question, Jeff.

Keith, why don't you talk about how we go about to execute those projects?

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**Keith Casey** - *Tesoro Corporation - EVP Operations*

Yes. So from a high level, when you think about where we are at in those projects, and I will start off with Vancouver Energy. We are 28 months into the permit process now, the 12-month permit process. And so that has given us an abundance of time to complete all the engineering. And we are really ready for shovels in the ground. Actually, within that labor force that is in Vancouver -- which is very close to Portland, not British Columbia -- within that labor force, there's readily available trades. And we believe we are ready to execute. And actually, that has been a key part of our strategy when we talk about shared values. Labor is very supportive of this project because of the support and jobs it will bring to the economy.

So then when you go down to Los Angeles integration and compliance project, again, that's a project we've developed since 2013, when we closed on that asset. Originally, we thought we were going to build a big diesel hydrotreater. We've found a better way now, with the modifications to the process units and with the pipeline interconnectivity. So we are well advanced in engineering. And again, we are ready with contracts and contractors to execute those projects.

The one that we are earliest in, last year in the capital plan we just talked about developing it, and that was to make xylenes. But mixed xylene is -- actually the process technology and isomerization technology -- it's pretty standard refinery technology. The unique way is the way we are

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connecting the logistics on the West Coast. But that's something we know very well how to do. So we feel very good about our capability to execute, and are just anxious to get the permits and to start putting shovels in the ground.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

We have project managers that are responsible for each individual project in the organization to be able to go out and do that. And just to build upon what Keith said about the mixed xylene, it's a stand-alone unit. There's not a lot of integration into the Anacortes refinery, which makes the execution easier than it would have been if it was highly integrated into the processing unit.

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**Jeff Dietert** - *Simmons & Company - Analyst*

Secondly, for Phil, if I could ask about the diversification within your MLP, the low oil price environment is impacting a lot of the investment and producing activity. Just a quick look through your EBITDA enhancement -- it looks like you are gathering system growth has moderated a bit, while your terminals growth has accelerated a bit. And maybe talk about the diversification across the portfolio, and how that impacts your ability to grow.

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**Phil Anderson** - *Tesoro Corporation - President Tesoro Logistics GP, LLC*

Yes, sure. You have got it exactly right. We have seen impacts to the prospects for the gathering and the pace of development in both areas. That being said, with the demand growth, with the projects that Tesoro is pursuing, we have focused very much this year on growing that demand-focused portfolio of opportunities. And that's something, like I said, we've got resources continuing to build that portfolio. And we will pursue those opportunities because they feel very secure; they are comfortable; that's in our markets; very durable.

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**Unidentified Audience Member**

[Christina Sterring], DB. So, Phil, clarification question on that: so if I think about the \$800 million to \$900 million that's in the [GNP] segment for growth sales out, what is the sensitivity there when you're thinking about that? Most of that is not contracted, at this point in time. So what commodity prices are you using? Is it a magnitude that could have sensitivity? Is it returns? Just help me frame that up.

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**Phil Anderson** - *Tesoro Corporation - President Tesoro Logistics GP, LLC*

In the logistics space, we can typically see out, sort of a couple years in terms of projects. So I think, as Steven said, in terms of 2016, those projects are largely complete. The commitments have been made. It's really just bringing that business online at this point.

As we look out further, we are in the types of dialogues with the types of companies that we would want as customers, who -- I don't think everybody is planning a \$30 price deck for three years type of approach. But it is dependent on sort of a -- I won't say a return to normalcy, but at least some forward progress on development around those fields.

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**Unidentified Audience Member**

Great. And then, Greg, a quick follow-on to that. When I think about logistics M&A, should I be thinking small bolt-ons, like the past two that I just saw? And how do I think about asset type and what it does to the business mix, in terms of percent volumes that are Tesoro-committed versus third-party committed, and what Q1 the goal number for that to be over the next 3, 5 years?

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

I think the answer to your last question is directionally we are moving away from Tesoro's commitments, Tesoro Logistics, and pursuing third-party business, partly because we tried to capture the synergies of how we go about that business. But today we are around 50/50. That was a target. And now we would move more to the third-party business because of the projects. By default, we get there by the projects that Phil has talked about in his presentation that we are doing in support of logistics services to people in our areas, particularly where we can then go in and acquire the crude oil.

So we don't have a specific target, Christina, for where we want to get to. But it will become less Tesoro and more third-party business over time. That's one question.

The first one you asked -- state that again, just so I can --.

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**Unidentified Audience Member**

Types of the asset mix, so like small -- should I assume small bolt-ons, not that logistics was as small as the retail in Alaska. And that's my assumption because you didn't technically give me an EBITDA number. Just walk me through stuff like that.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Yes. So we are looking at -- we stay focused in our area. I think that's an important thing. A lot of the things that the organization is looking are generally a little bit smaller. There aren't any major things that we're looking at now. We would look at potentially companies -- if it fits into our business, especially in this environment. But our business development people have been more focused on doing things to drive organic growth in that. But we will scan everything that's available in the market. It just has to fit our criteria for fitting into the Company.

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**Faisal Khan** - Citigroup - Analyst

Faisal Khan, Citigroup. Just a couple questions, one for Phil, and then Keith and then CJ. Phil, the recent rates [on order of anticipated] transaction is targeted 5 to 6 times EBITDA, once you have integrated the system into your portfolio. Is that the new market, do you think, for acquisitions out there? Or is this a one-off, unique opportunity that exists today?

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**Phil Anderson** - Tesoro Corporation - President Tesoro Logistics GP, LLC

This was definitely a single opportunity that was pursued. I think it's uniquely positioned. I think we have a lot of unique value because of the way it fits into our pipeline system up there. So I wouldn't call the market based on a single transaction at this point. Every asset trades around the outlook for what's capable and who has synergies around it.

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**Faisal Khan** - Citigroup - Analyst

Okay. And then on the refining side, Keith said the turnaround in sustained spending is rising. I think some of that you described as tier 3 capital. What is causing this general inflation with sustained capital spending and the turnaround spending that we've seen in the previous years?

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**Keith Casey** - Tesoro Corporation - EVP Operations

In the turnaround category, we are actually working to stabilize and balance that spend over the course of years in that \$250 million to \$300 million range. And then we drive that down in competitive performance. The sustaining capital, as we've talked about, is really the primary area where we

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are driving our liability improvements. We are investing to have lower costs through the cycle or emissions reductions. So as you mentioned, tier 3 gasoline would be in that component.

We also have a couple of large projects, or sizable projects, at Salt Lake City and Martinez, where we are going to further improve our environmental performance and compliance and the reliability of those assets over time. So that's where you see that peak in capital really around the 2016-2017, in the sustaining category. And we will work that down again, over time, in the base, and really focus on the competitiveness over the cycles.

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**Faisal Khan** - Citigroup - Analyst

Okay. And on the integration project, the 30,000 to 40,000 a day of flexibility between gas and distillate that you are going to add -- is that an immediate switch from distillate to gasoline, when that project comes online? Or is there some sort of addition? How is that volume really going to translate into what gets into the market, and what comes out of the market?

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**Keith Casey** - Tesoro Corporation - EVP Operations

Yes. And the danger is refining (inaudible) on this question. But we are able to maximize. And we are going to be able to make 100% CARB gasoline out of this asset, which we presently can't. There's a certain volume but we don't make 100% CARB. We are taking those molecules that today are not of CARB quality or tier 3 standards. And we are going to be able to make them CARB gasoline. In addition, we are taking any distillate molecules that were not optimized between both refineries and we are putting them into the highest-value place.

Through our creative use of the hydrotreaters, we're going to be able to swing that production of gasoline to diesel another 30,000 to 40,000. And that's really distinctive. You see some of our competitors making big bets on big diesel hydrotreaters. We believe that flexibility and agility is a competitive advantage. And we want to be able to take advantage when it's a high gasoline market and when it's a high distillate market. So we are really going for the flexibility in our design.

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**Faisal Khan** - Citigroup - Analyst

Net-net, how much CARB gasoline will you add to the market after this project if it's done?

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**Keith Casey** - Tesoro Corporation - EVP Operations

I don't want to give that out. But we will be 100% CARB. Okay?

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**Faisal Khan** - Citigroup - Analyst

And for CJ, a last question for me. Marketing -- is the goal to get to 3,800 stores -- I think there's about 13,000 stores in California. Is there a limit in terms of how many stores you can own? At what point can you -- are you not allowed to own anymore stores and the FTC sort of --

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**CJ Warner** - Tesoro Corporation - EVP Strategy & Business Development

Well, I suppose that would -- if we really push the limit, that would be something that we would have discussions about. But the store additions that we are looking at aren't in just one region, of course; it's across all of our regions. And the focus that we have is trying to get to 100% integration. So we may go above 100% in some regions, partly because the businesses that we are looking at just happen to be attractive at higher than that. But if you want to get your head around where those stations are all going to be, it's going to be scattered based on our refining production.

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**Faisal Khan** - Citigroup - Analyst

There's no market power test by owning too many stores, as far as --.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

You have to remember, Faisal, that those stations in California -- we show 1,200 of them. We own only a part of those, and other people on the other part. They just happened to brand them through us. So there's a distinction there.

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**Faisal Khan** - Citigroup - Analyst

Thanks.

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**Sam Ramraj** - Tesoro Corporation - VP IR

Neil?

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**Neil Mehta** - Goldman Sachs - Analyst

Neil Mehta, Goldman Sachs. First question is around dividend growth. You talked through your dividend strategy here. What are you solving for, ultimately? Is it the yield? Is it to be competitive from a payout perspective? And how do you think about dividend growth on a go-forward basis? You had a big raise earlier this year, right?

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Where we are in the growth cycle of the Company -- we have been increasing the dividend substantially. And just when we get to the yields of the industry, we are growing through it. So as we've talked through it with our directors and leadership team, we think continuing to grow dividends commensurate with the business growth and continuing to grow the payout ratio; and ultimately, one day, that may translate into yield. But it's hard to look at yield as one metric. So it's really about growth in the dividend. But it's also within this capital structure framework that we talked about of also being able to buy back shares at the same time.

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**Neil Mehta** - Goldman Sachs - Analyst

And Greg, last year you provided differential assumptions in the slide deck for Brent A&S and Brent Bakken and Brent, WTI. This year, we get the Tesoro index. But could you talk about just how you are thinking about the differentials? Our framework -- and I think it was your Company's, as well -- historically was to look at marginal costs of transportation. But the market is evolving in terms of thinking around these differentials. Any perspective on the key components of the differentials would be helpful.

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**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

The differentials that are important to us -- if you look at where they shake out for 2015 is how we see them next year. We still believe that incremental movement out by transportation will set the differential. I think in this case, in Bakken this year, you just had some unusual things happening. And you have people that have commitments that are moving stuff out in there. But I think, over time, they will still be driven by that incremental cost to move the barrel out of there. So we see them fairly tight again next year, versus how they were this year.

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**Neil Mehta** - *Goldman Sachs - Analyst*

Last question for me is just to close the loop on the M&A point. Greg, you've made no secret that the Mid-Continent is interesting for the Company as a place to expand. In a world where differentials are tighter, is the Mid-Continent still the right place to grow? And as you think about M&A, are there going to be opportunities -- in your view here, in the next couple of years, either on asset or a company level -- [the floor is]? Or will you have to go after it, if that makes sense?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

So we have always dated our geographic preference for the company, primarily driven by our business model to be highly integrated. So it's kind of -- if you have that type of a business model, it somewhat takes you out of the Gulf Coast and other parts of the country. So we believe -- because that's what we believe we can execute extremely well and capture value. But that gets you into the Mid-Continent with our strong West Coast position. So that geographic area has always been our favored place to do business.

And with the changing dynamics for crude differentials, and even maybe what you think on gasoline prices in the Mid-Continent with some of the things going on there, I think we factor all those into anything that we would look at and take a view on it. But I think at the end of the day, Neil, it's going to be driven by if there is an opportunity for the Company and if it fits and meets our criteria strategically, how do we extract value from that asset, or group of assets, or company, whatever it may be? So we have to look at them all on an individual basis. And I think you have to make them happen yourself.

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**Unidentified Audience Member**

Just on the theme of integration, does Vancouver Energy underpin any of the other Pacific Northwest capital projects, the isomerization unit and the MX? Do you need those light crude volumes into those units to produce --?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

No.

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**Unidentified Audience Member**

Okay.

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Not at all.

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**Unidentified Audience Member**

Is it the other way around? Does the uplift from those units pay for the railroad costs for Vancouver Energy?

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

No, not necessarily. It's pretty much -- it's the crude supply and the advantage, the real advantage of being able to get Bakken crude there is in the yield. But for the projects that we are talking about, it really has no impact on them.

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### Unidentified Audience Member

Okay. And then this is a follow-up to the earlier logistics M&A question about multiples and one-off opportunities, versus where the market structure is as a whole. Was the multiple for Great Northern Midstream the determining factor that caused the TSO Corp. to make the acquisition, as opposed to TLLP directly, as was the case with Rockies gas? Or are there other factors at work, beside just that price?

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### Greg Goff - Tesoro Corporation - Chairman, President, CEO

Yes. Let me build upon what Phil has said earlier, specifically around that business. So the map did a good job -- I don't know if you can see it. It's not in your book. But it basically extends our strong logistics position in North Dakota to the South. And it will tie in perfectly with Tesoro High Plains Pipeline. So that was one of the driving factors there that allowed us to do it. It also gives access to crude supply from areas where we haven't been buying crude oil for Tesoro, so that bringing it on to the system and that will do it. But it's almost a natural fit there.

So the multiple that maybe, I think, Jeff, you asked about and Phil talked about there -- I think this was a unique acquisition because of a number of factors there, because it happened to fit well into our business and probably the market environment that we are in today. But because of -- we just did a drop-down and funded a drop-down here within the last 30 days. And going back, and hopefully once we get through the regulatory approval for this, which could happen, say, in January or February, we would be closing on that. It's just easier to warehouse that investment into Tesoro.

And Phil was very clear that we will drop it down, at some point in time. It just offers some opportunities for us to how the business is operated. We can fit it into our system and enhance the overall operations of that business. It is very, very flexible.

And so we will get that done, and then just drop it down. So I would view the reason we did it in Tesoro was more of a warehousing of the investment and the fact that we just did a drop-down.

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### Sam Ramraj - Tesoro Corporation - VP IR

Bryan?

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### Bryan Zarahn - Barclays Capital - Analyst

Bryan Zarahn, Barclays. A few more logistics questions. Greg, you have been very supportive of the MLP, as evidenced by the last drop-down. And if we are still in this weak capital market environment, what type of support will you offer the MLP, whether it's on financing or multiples for drop-downs?

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### Greg Goff - Tesoro Corporation - Chairman, President, CEO

The drop downs -- anything we do on drop downs -- they are market-based. I think Steven pointed that out. When we look at -- you have to look at each individual asset, at the generalized -- a specific multiple is not the right thing to do. So our recent drop-down was a lower multiple because we saw less upside in the business. And between the negotiation between the two companies, that's where the dust settled on doing it.

So we use a very market-driven approach to establish the drop-down value on a number of factors; have a very strong process, through our conflicts committee, with the logistics company and that. So the multiples will be where they shake out, market-driven multiples.

And then from the support standpoint, I think Steven said if we need the capital for the business and we are in a difficult market condition, then Tesoro would take the equity.

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DECEMBER 09, 2015 / 2:00PM, TSO - Tesoro Corporation 2015 Analyst and Investor Day

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**Steven Sterin** - Tesoro Corporation - EVP, CFO

Yes, and as we look at the -- at least the next couple-year outlook, to a question asked earlier, the 50/50 on drop-downs -- that's a support. Right? Tesoro taking 50% equity. And then as we look at the -- and the drop-downs are about the same size as the organic investments. And as we think about the organic investments, roughly 50/50, that's debt and the ATM. So it really alleviates the need, right? This approach where the support comes in, to go out and be pushing units that will fund that growth. So the base plan, supported 50%, Tesoro take equity and 50% cash.

---

**Bryan Zarahn** - Barclays Capital - Analyst

And as you think about market multiples, how are they changing from Midstream assets, given almost all the buyers' cost of capital, including TLLP's, has risen?

---

**Phil Anderson** - Tesoro Corporation - President Tesoro Logistics GP, LLC

When we went through this with the committee on the recent drop, it really does come down to the asset. You see very attractive assets with lots of growth, and a high certainty going for high multiples. I think something traded, just in the last couple weeks, at some -- like nearly 20 times multiple out there. And we've seen some very high other multiple transactions this year. And then you see very stable assets, like the drop we just did, where there's no upside but there's great stability at a lower multiple.

And then you can take the other extreme, which is this one-off asset in the Bakken that on a stand-alone basis is otherwise isolated; unless you can fit it into something like our system, you go at a much lower multiple. So it's very asset-dependent, I think.

---

**Bryan Zarahn** - Barclays Capital - Analyst

And the last one for me -- appreciate the extended guidance. Any change to your distribution growth guidance in light of, again, the cost of capital environment? And how does that outlook, if at all, change, given your pursuit of investment-grade status for the MLP?

---

**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

So we see our distribution growth in the logistics Company for the next couple of years staying where it's been. We feel very comfortable with the work we have going on in that, that we will be able to sustain that. But at some point, with the size of the Company, the distribution growth is going to come down into the low teens. It will take probably a little bit of a step down here. But over the next couple of years or so, we are very comfortable with maintaining that 17% distribution growth.

---

**Steven Sterin** - Tesoro Corporation - EVP, CFO

And investment-grade requirements -- when you look at the plans and the funding strategy that I've just laid out, there's not a pull on that distribution from needing to get to investment-grade. We get there through the growth of the business.

---

**Brad Heffern** - RBC Capital Markets - Analyst

Brad Heffern, RBC. Greg, just going back to your comments earlier on gasoline demand, there's a thesis out there that the California market, given the growth we've seen of late, is going to get structurally tighter and tighter. Then maybe things start to look a lot more like 2015 than they do 2014. I'm curious if you subscribe to that viewpoint. And when I ask the question, I'm thinking about in the context of the sometimes scary legislative proposals like AB 350.

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DECEMBER 09, 2015 / 2:00PM, TSO - Tesoro Corporation 2015 Analyst and Investor Day

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**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes. From just the fundamentals of PADD V, when you look at the entire West Coast with where demand is now versus where it was, especially coming out of the financial crisis, there's no question the demand has strengthened. You look at the capacity to produce gasoline on the West Coast and the need to run at higher utilization rates, we believe that's all supportive to a favorable margin environment. So those factors have built up over time. And that's why earlier, when we talked about the index, and we said we see the index up \$1.50 to \$2 versus 2014 -- it's based upon that view of California.

On 350, Keith, do you want to talk about AB 350?

---

**Keith Casey** - *Tesoro Corporation - EVP Operations*

I just want to make sure I clarify. Are you talking SB 350, that --.

---

**Greg Goff** - *Tesoro Corporation - Chairman, President, CEO*

Yes, AB, not (multiple speakers) --

---

**Keith Casey** - *Tesoro Corporation - EVP Operations*

Yes, yes, or AB 32 is a [low call reference fish netter].

---

**Brad Heffern** - *RBC Capital Markets - Analyst*

So I'm talking about the proposal that didn't make it through (multiple speakers) 50% decline.

---

**Keith Casey** - *Tesoro Corporation - EVP Operations*

I want to clarify. So there's no doubt that California will continue to be in that lead position about climate change and some of the environmental things. And I'll just reiterate that that's really important with the shared value approach we have taken on our projects. Greg talked about over 300,000 tons of CO2 reduction through our integration and compliance project, and even the substantial emissions reductions capable through Vancouver Energy.

And so we are positioning ourselves, and our aspiration within that shared value is to be a trusted voice in the industry. So we do want to continue to meet the customers' demands. And we want to do that in the most responsible fashion, and take advantage of those opportunities through reduced footprint and improving the environment. And that's given us a differential access for these growth projects.

---

**Sam Ramraj** - *Tesoro Corporation - VP IR*

We have time for one last question. Please go ahead, sir.

---

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DECEMBER 09, 2015 / 2:00PM, TSO - Tesoro Corporation 2015 Analyst and Investor Day

**Andy Burd** - JPMorgan - Analyst

Andy Burd, JPMorgan. Logistics question: the terminal and transportation CapEx guidance -- \$400 million to \$600 million of [flat times] multiple -- roughly how much of that is Tesoro EBITDA that TSO will be paying TLLP? And assuming it's a high number, does that -- is it fair to state that you have high confidence in both the multiple, as well as the amount of spending that will occur by 2018 in the segment? And then I have a follow-up.

---

**Phil Anderson** - Tesoro Corporation - President Tesoro Logistics GP, LLC

It's probably about two-thirds Tesoro; one-third third-party EBITDA. But again, the other parties we deal with in our business are other large independent refiners and integrations.

---

**Andy Burd** - JPMorgan - Analyst

And unlike the gathering, is it fair to assume that given the downstream, which is the nature of those assets, or the ramp-up would be fairly quick?

---

**Phil Anderson** - Tesoro Corporation - President Tesoro Logistics GP, LLC

Well, it takes a little longer to spend on those projects. But when you turn them on, they pretty much run right away.

---

**Andy Burd** - JPMorgan - Analyst

And then just a quick follow-up for the gathering and processing CapEx guidance. Any rough breakdown between Tesoro versus third parties, as well as Rockies natural gas versus Bakken crude gas?

---

**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

Almost all of that is third-party.

---

**Sam Ramraj** - Tesoro Corporation - VP IR

At this point, we don't have any further time for questions.

I would like to turn it over to Greg for closing comments.

---

**Greg Goff** - Tesoro Corporation - Chairman, President, CEO

So thank you today for your time, and listening to the questions. I would also like to thank the members of management and our Board for being here today to help us lay out what we think are some pretty significant plans for the Company as we move forward. So thank you very much.

DECEMBER 09, 2015 / 2:00PM, TSO - Tesoro Corporation 2015 Analyst and Investor Day

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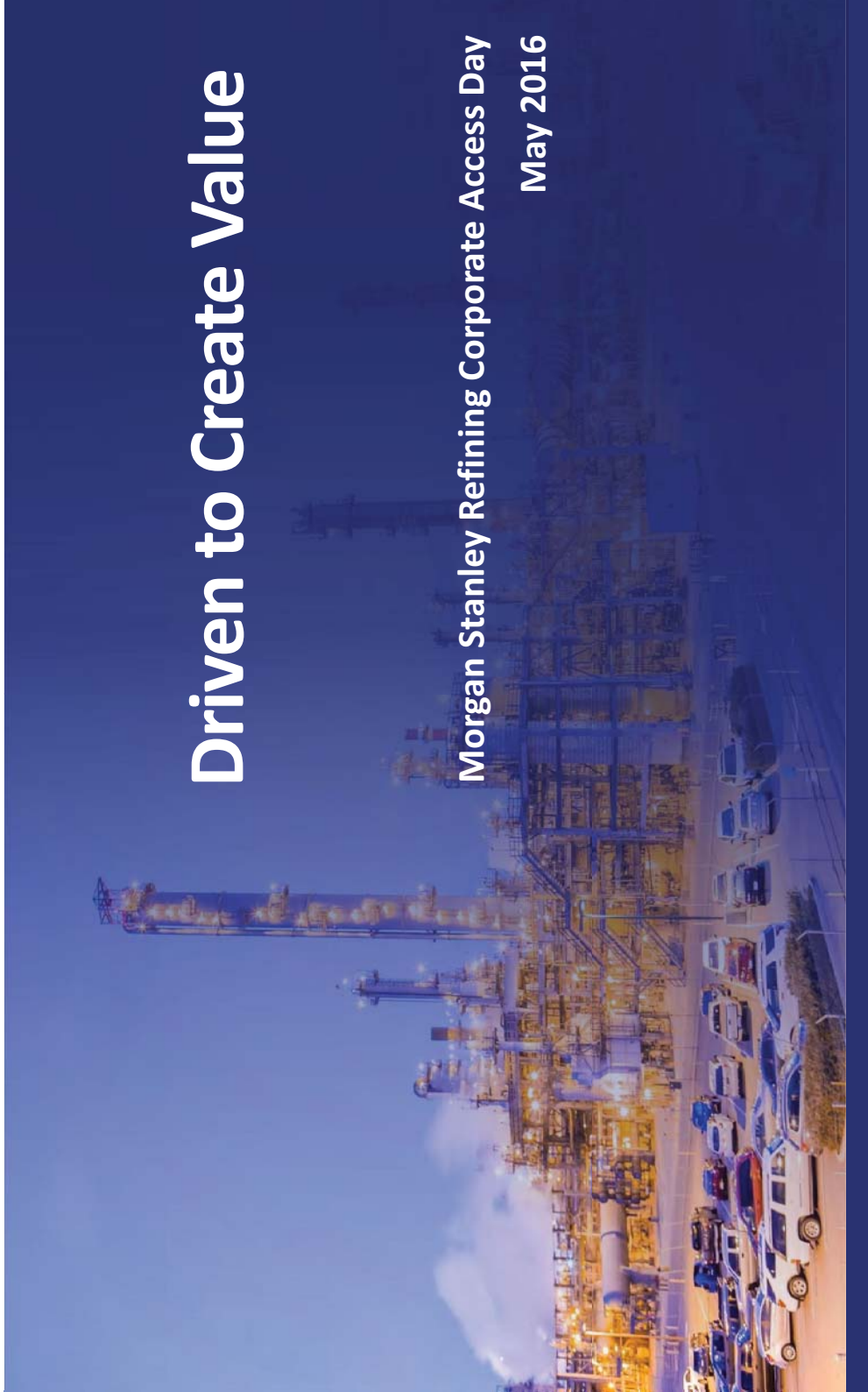
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# Driven to Create Value

Morgan Stanley Refining Corporate Access Day  
May 2016



# Forward Looking Statements

This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to, among other things:

- the ability to maintain and benefit from our competitive advantages; • our ability to execute on our strategic priorities, including operational efficiency and effectiveness, high performing culture, value-driven growth, value chain optimization and financial discipline, as well as the potential impact of such execution; • EBITDA estimates, growth and targets for Tesoro, Tesoro Logistics LP (“TLLP”) and various portions of their businesses (including the EBITDA contribution from new business investments and business improvements); • expectations regarding annual improvements in throughput and capture rates, annual business improvements, and new business investments; • the market outlook, including expectations regarding the Tesoro index, marketing margins, the balance between refined product production and demand, crude oil differentials and refined product exports; • expectations regarding operational availability, refining utilization and gross margin capture; • our advantaged refining network, including access to and volume of advantaged feedstocks, transportation and logistics advantages, concentrated product demand markets, and gross margin advantages; • the advantages of our refining flexibility; • anticipated spending for turnarounds, sustaining capital and growth capital and the benefits of such spending; • the cost, timing and benefits of our Los Angeles integration and compliance project, our the Port of Vancouver marine terminal joint venture, our mixed xylenes project, our isomerization project, and other major projects (including capital projects, organic projects designed to create new business opportunities, and strategic acquisitions by both Tesoro and TLLP), including expectations regarding anticipated rates of return and incremental EBITDA improvements; • the global market for mixed xylenes; transportation advantages and our potential competitiveness as a supplier of xylene; • the cost, timing and results of our logistics growth strategy, including TLLP’s asset optimization and organic growth opportunities, opportunities for strategic third-party and Tesoro acquisitions, and the expansion of TLLP’s third-party business; • the potential earnings generated by possible future logistics asset sales to TLLP; • TLLP’s strategic approach to acquisitions; • expectations regarding TLLP continuing to drive unitholder value; • our plans to create additional value through our marketing business, including enhancements to the existing business, organic growth, and strategic acquisitions, including targeted business improvements, branded volumes and retail site counts; • maintaining Tesoro’s financial priorities and executing its financial strategy, including expectations for free cash flow, targeted returns for capital projects and delivering best-in-class return on invested capital, maintaining minimum cash balances, target debt capitalization levels, target leverage levels, achievement and benefits of investment-grade credit ratings, continued dividend growth, and returning cash to shareholders; • the anticipated percentage of our EBITDA generated by refining, marketing and logistics assets; • the multiple applicable to Tesoro’s general partner interest in TLLP and the implied value of Tesoro’s stake in TLLP; and • enhanced commercial opportunities and other growth prospects for both Tesoro and TLLP.

We have used the words “anticipate”, “believe”, “could”, “estimate”, “expect”, “intend”, “may”, “plan”, “predict”, “project”, “should”, “will” and similar terms and phrases to identify forward-looking statements in this Presentation.

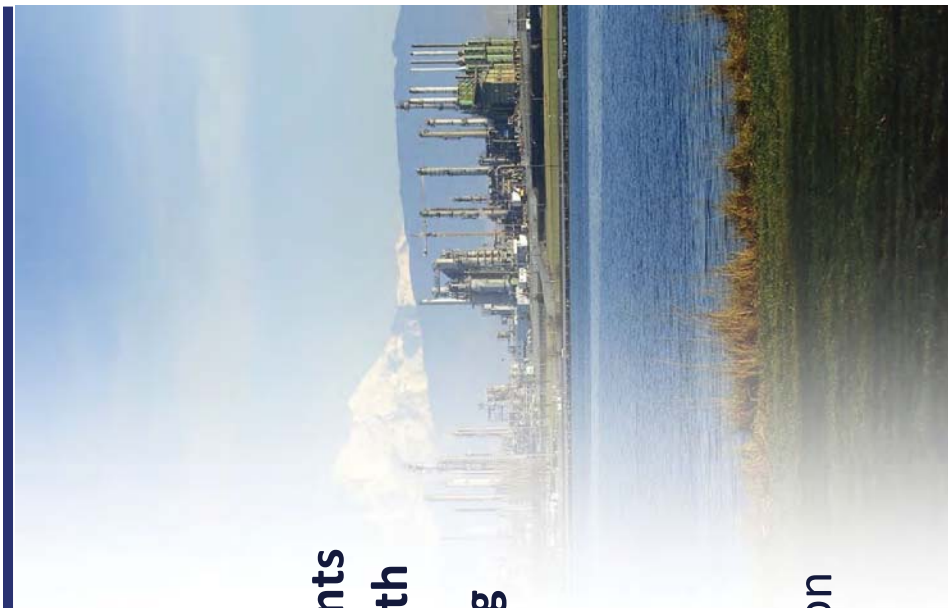
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Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in our filings with the SEC. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this Presentation.

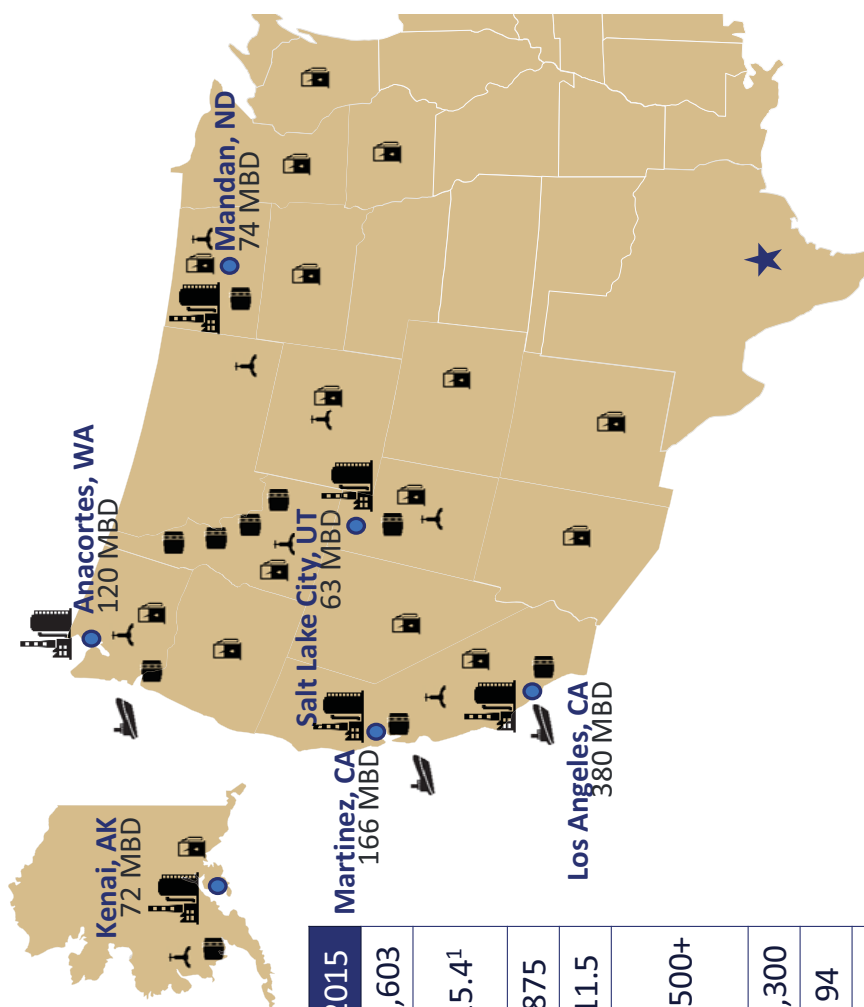
We have included various estimates of EBITDA and free cash flow, each of which are non-GAAP financial measures, throughout the presentation. Please see Appendix for the definition and reconciliation of these EBITDA and free cash flow estimates.

## Tesoro's Competitive Advantage

- The **leading** integrated refining, **marketing and logistics** company in our strategic footprint
- Driving significant **business improvements** and creating **sustainable earnings growth**
- Demonstrated **track record of delivering results** and achieving ambitions
- Well diversified earnings portfolio with **strong growth** opportunities
- **Disciplined approach** to capital allocation to create significant shareholder value



# Changes in Tesoro's Business 2010 - 2015



Key Metrics	2010	2015
EBITDA (\$ in millions)	551	3,603
Enterprise Value (\$ in billions)	3.5	15.4 <sup>1</sup>
Refining Capacity (MBD)	665	875
Refining Complexity	9.8	11.5
Crude oil, refined product and natural gas pipelines (miles)	900+	3,500+
Branded Retail Stations	880	2,300
Marketing Integration (%)	31	94
Employees	5,300	6,000

1) As of 5/6/2016

## Strategic Priorities

- **Operational efficiency and effectiveness**
  - Safety and reliability
  - Cost leadership
  - System improvements
- **Value Chain Optimization**
- **Financial discipline**
- **Value-driven growth**
- **High Performing Culture**



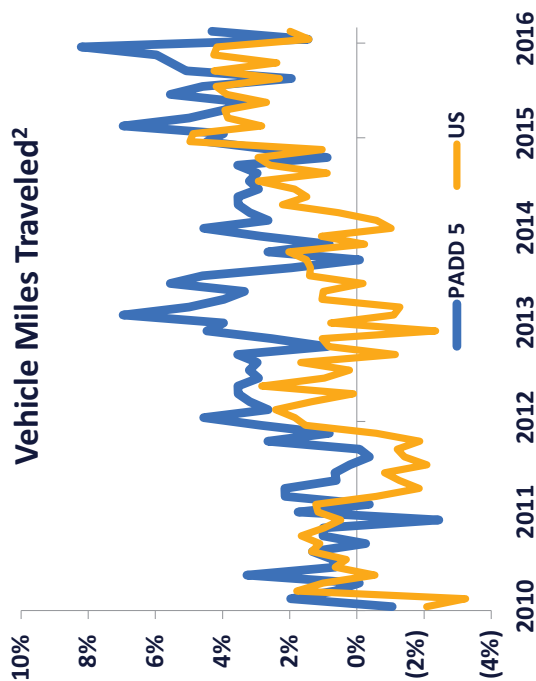
Enduring commitment to execution

# PADD V Remains Strong

## PADD V Supply Demand Balance

Mar 2015 - Feb 2016

Average MBD	Production <sup>1</sup>	Demand
Gasoline	1,361	1,597
Diesel	571	514
Jet	427	477
<b>Total</b>	<b>2,359</b>	<b>2,589</b>



- PADD V gasoline/jet requires imports from domestic and foreign supplies
- Diesel production marginally exceeds demand requiring export
- Vehicle Miles Traveled **consistently outpacing** the U.S. average

Source : PADD V Supply and Demand Balance: EIA

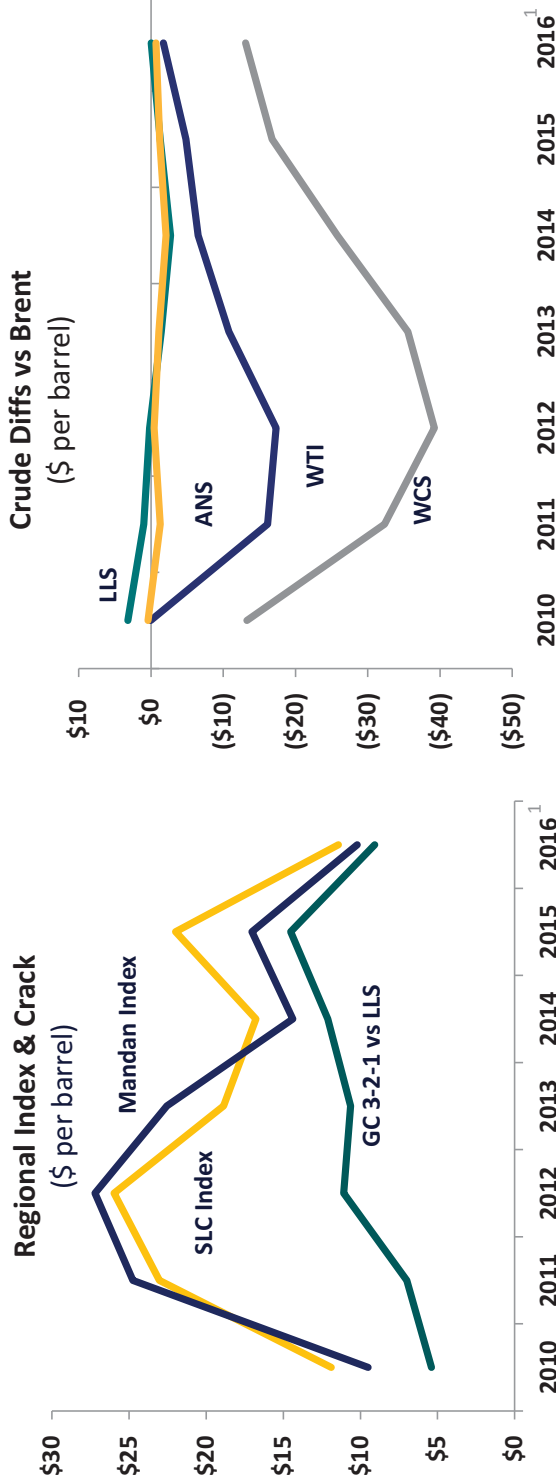
1) Production = Prod Supplied adjusted for Foreign and InterPADD imports/exports (plus 9.5% EtOH for gasoline)

Source: Vehicle Miles Traveled: FHWA

2) VMT for 2016 through February



# Mid-Continent Margins Weaken

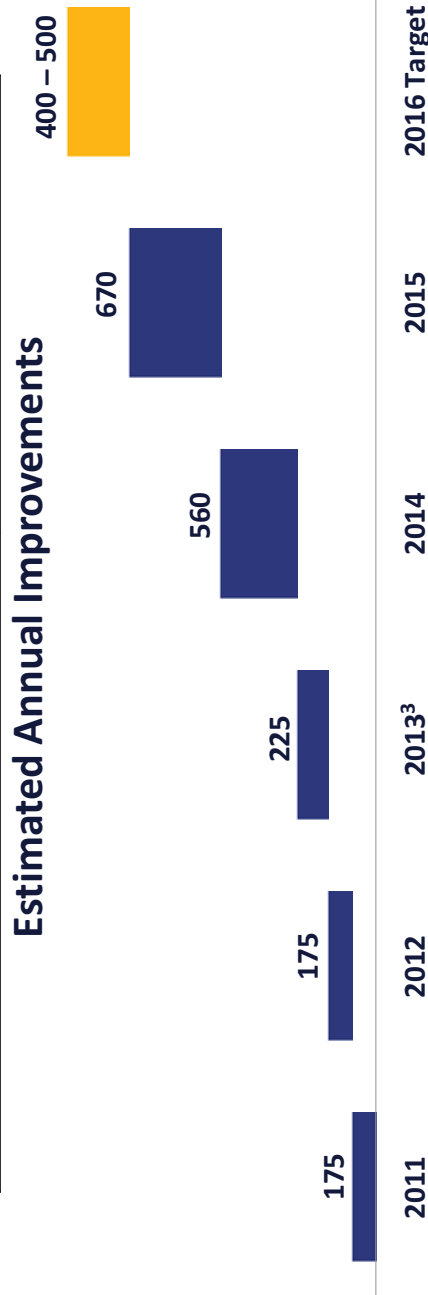


- Lower crude oil price environment supportive to gasoline demand
- Crude oil differentials narrower than 2011-2015 period

1) The 2016 data point is 1Q average

# Clear Plan for Improvements in 2016

(\$ in millions)	2016 Target
Refining <sup>1</sup>	200 - 250
Logistics <sup>1</sup>	175 - 200
Marketing	25 - 50
<b>Improvements</b>	<b>400 - 500</b>
<b>Higher Utilization and Capture<sup>2</sup></b>	<b>500 - 600</b>
<b>Total Improvements</b>	<b>900 - 1,100</b>



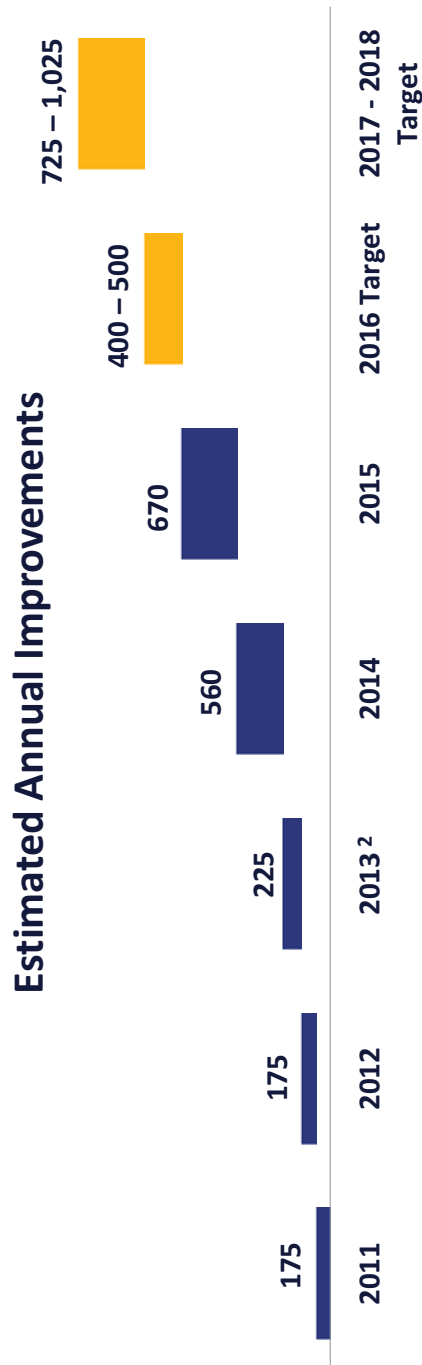
1) Includes a drop-down of \$50-75 million of earnings from Refining to Logistics

2) Improvement assumes no labor disruption in 2016

3) 2013 excludes Carson acquisition

# Growth in Improvements Beyond 2016

(\$ in millions)	2017 – 2018 Target
Refining <sup>1</sup>	100 - 200
Logistics <sup>1</sup>	250 - 275
Marketing	325 - 450
New Business Investments	50 - 100
<b>Total</b>	<b>725 - 1,025</b>



1) Includes a drop-down of \$50-75 million of earnings per year from Refining to Logistics

2) 2013 excludes Carson acquisition

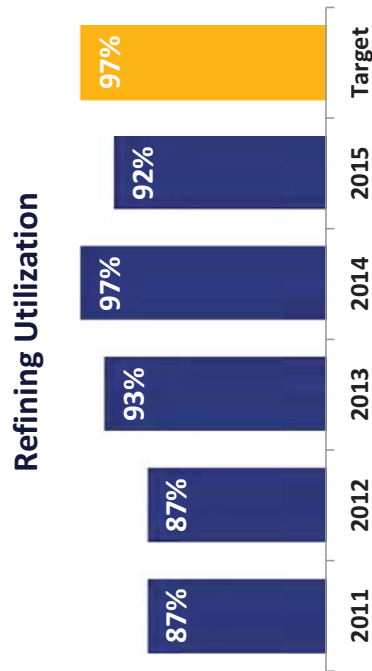
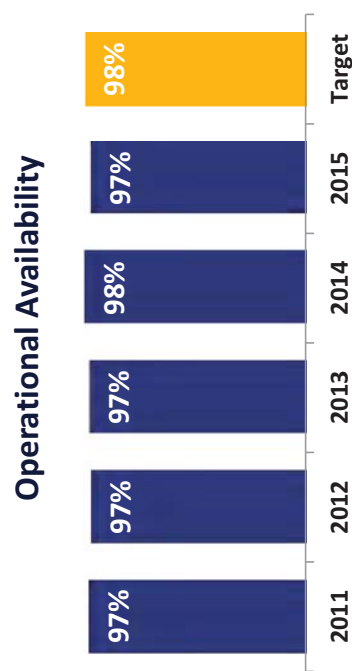
## Highly Competitive Refining System

- **Regionally advantaged** crude oil access
- System-wide value chain optimization resulting in **strong gross margin capture**
- Operational excellence **enabling world class** asset availability of >97%
- Business Improvement conviction **delivering an estimated \$200 million** annually
- High Performing Culture **driving continuous improvement**
- **Strategic projects** enhance feedstock flexibility, yields and lower costs



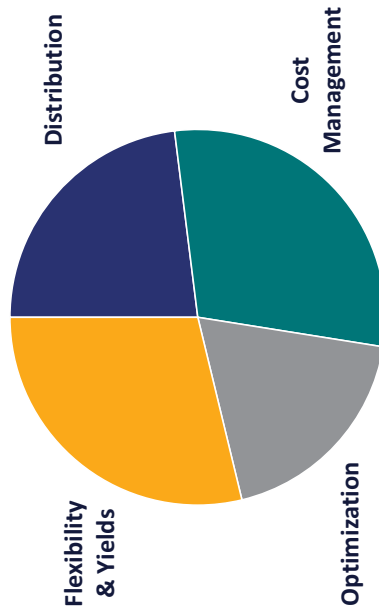
## Driving High Reliability and Utilization

- Sustaining **World Class availability** via mechanical integrity programs and reliability investments
- **High Utilization** to meet market demand
- Leadership driven **Operational Execution** and management systems standardization



## Improvements Bolstering Earnings Growth

- Targeting \$200 million of annual improvement



- Driving \$150 million of operating expense savings relative to peers by 2018<sup>1</sup>



1) Relative to peers as reported in Worldwide Fuels Refinery Benchmarking Study (“Solomon Study”)

## Strategic Investments for Distinctive Value

- **Creating advantage through integration**
  - Los Angeles Refinery Integration and Compliance Project
- **Changing the West Coast crude oil supply dynamics**
  - Vancouver Energy Project
- **Capturing higher margins in a high growth market**
  - West Coast Mixed Xylenes Project
  - Anacortes Isomerization Project



## Creating Competitive Advantage at the Los Angeles Refinery

### Los Angeles Integration and Compliance Project

- Completes full integration of Los Angeles Refinery
- Provides 30 to 40 MBD of gasoline and distillate yield flexibility
- Improves intermediate feedstock flexibility
- CO<sub>2</sub> emissions reduced over 300,000 tons annually<sup>1</sup>
- Reduces NOx, SOx and CO emissions

### Estimated Project Details

- CAPEX \$460 million
- EBITDA \$100 million
- IRR 20%<sup>2</sup>

Enhancing West Coast competitive position

1) CO<sub>2</sub> reduction associated with expected operations

2) Includes benefits from capital avoidance



# Supplying Advantaged Crude Oil to the West Coast

## Vancouver Energy Project

- Joint venture with Savage Companies
- Up to 360 MBD Rail-to-Marine Terminal
- Most efficient route to West Coast for Bakken crude oil
- Significant infrastructure exists; low development cost

## Strategic Crude Supply

- Increases West Coast competitive crude supply
- Relative refining values of \$3 to \$5 per barrel

## Logistics Growth

- Potential assets for offer to TLLP
- Tesoro a major, dedicated customer
- Significant third party revenue

## Estimated Project Details

- CAPEX \$200 million<sup>1</sup>
- EBITDA \$100 million<sup>2</sup>
- Tesoro IRR 40%+

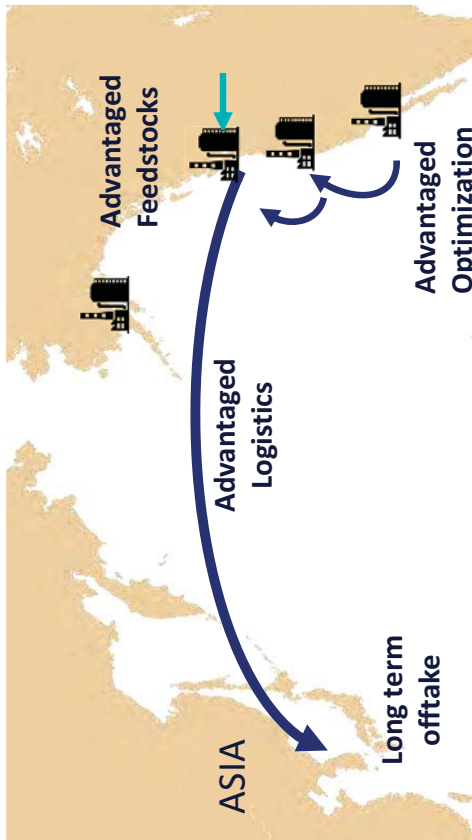


1) Tesoro and Savage capital expenditures

2) Tesoro expected EBITDA

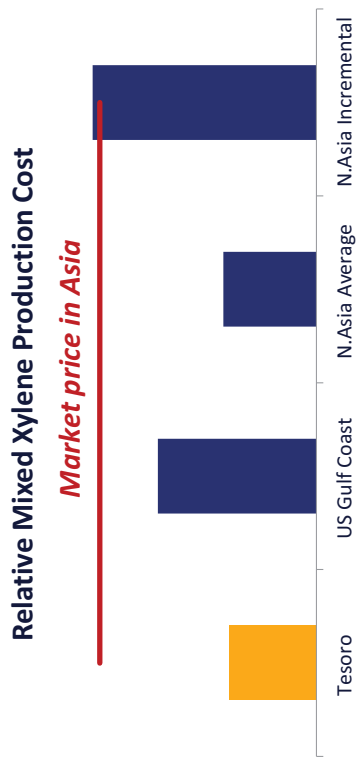
# Supplying Mixed Xylene to Asia

- West Coast Mixed Xylene Project**
- Upgrading gasoline components to mixed xylene
  - Large and growing market in Asia
  - Transportation cost advantage relative to the Gulf Coast
  - Manufacturing cost advantage
  - New logistics business opportunity



**Estimated Project Details**

- CAPEX \$300 million
- EBITDA \$100 million
- IRR 20%



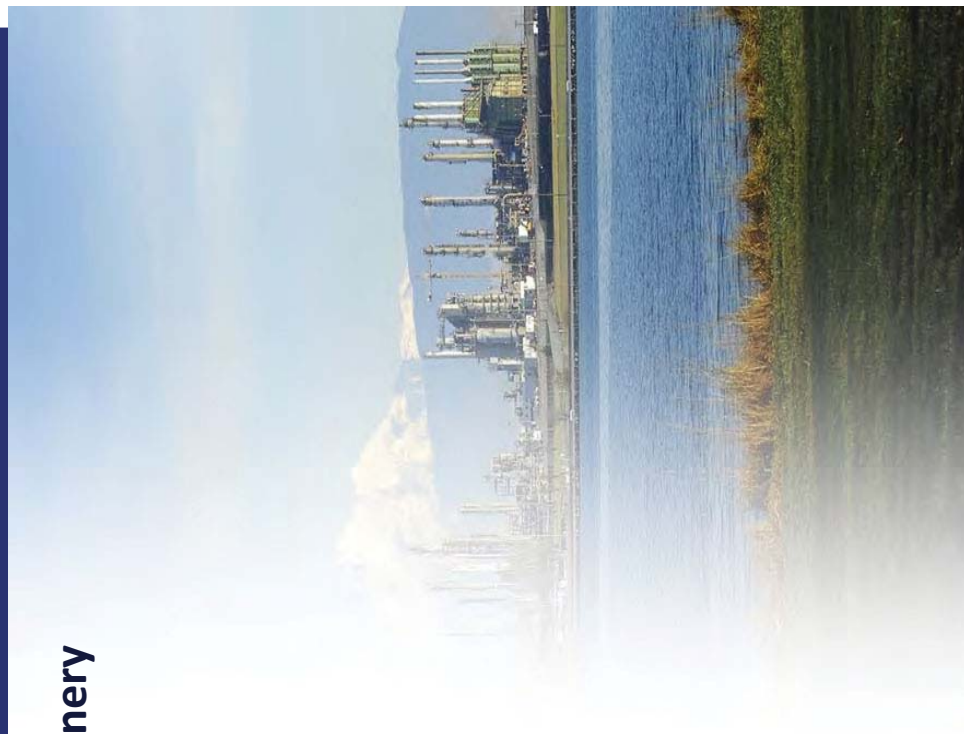
# Optimize Gasoline Production at Anacortes

## Isomerization Project at Anacortes Refinery

- **Reduces octane** production costs
- Efficiently **meets Tier III** sulfur requirements
- **Increases** Mixed Xylenes production

## Estimated Project Details

- CAPEX \$100 million
- EBITDA \$40 million
- IRR 20%



## Tesoro Logistics' Competitive Advantage

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- **Leading provider of logistics services** to oil and gas producers and refining and marketing companies in strategic footprint
- Tesoro's strategy supports **integration** and drives **high growth**
- **Clear path to reach \$1 billion** of EBITDA by 2017
- Pursuing acquisitions that fit **integrated business model** in proximity to strategic footprint

# Strategic Framework to Drive Growth



# Tesoro Marketing Overview

- We market fuel under premium brands

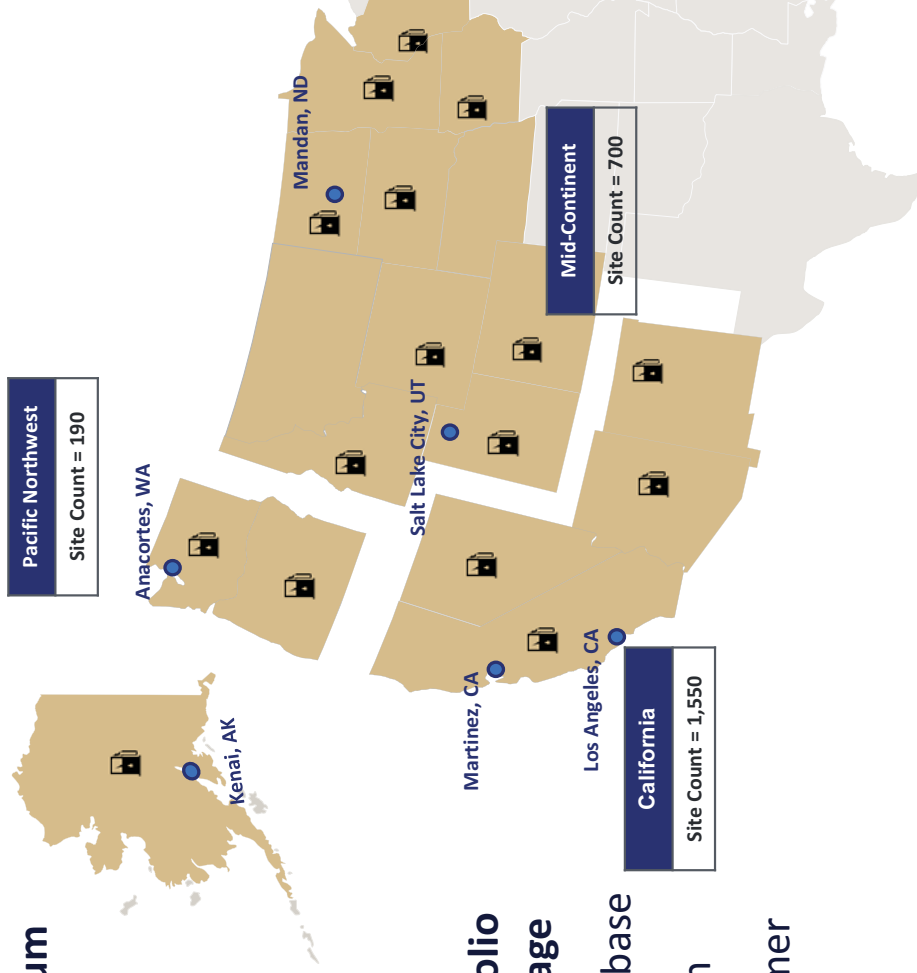


and value brands



- Distinctive multi-brand portfolio provides competitive advantage

- Serves broader customer base
- Fosters more rapid growth
- Addresses regional customer preferences



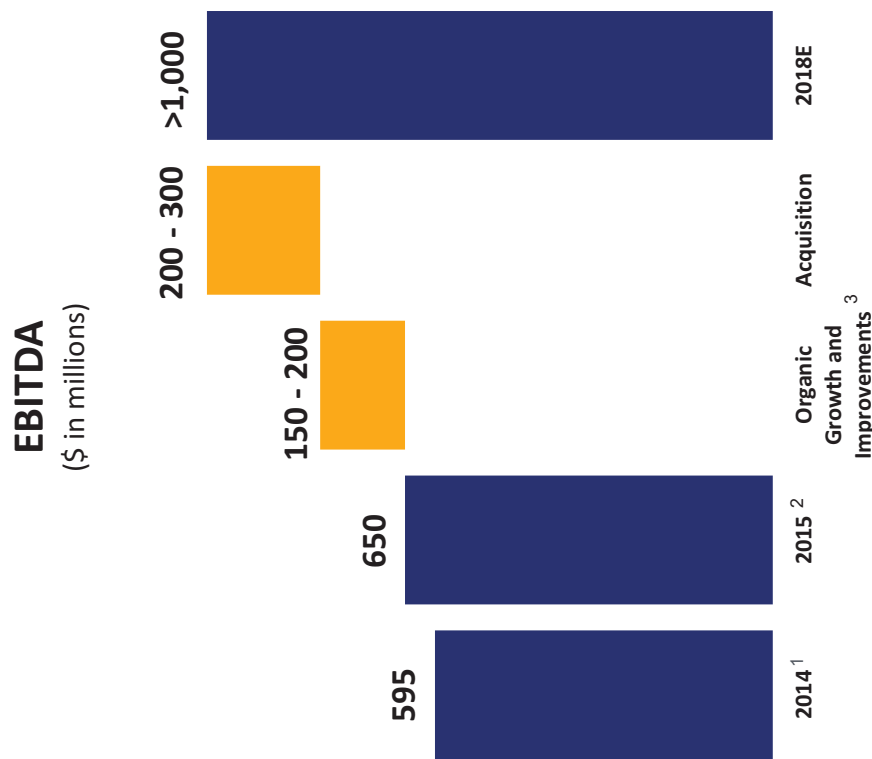
## Driving Marketing to \$1 Billion of EBITDA by 2018

- Drive \$150 - \$200 million of organic growth and improvements 2016-2018

- Implement store improvements
- Increase marketing margin by focusing on branded retail
- Drive growth by adding ~350 new retail locations by 2018
- Invest in brands

- Deliver \$200 - \$300 million of additional EBITDA growth through strategic acquisition

- Maximize branded integration by acquiring retail businesses
- Substantially enhance convenience store position



1) Excludes RINs and ratability

2) 2015 Adjusted EBITDA of \$945 million. 2015 at 2016-2018 marketing margins would be approximately \$650 million

3) Represents estimated improvements of operating income

# Financial Strategic Priorities

## Improvements Drive EBITDA and Cash Flow

- EBITDA growth of 46% CAGR from 2010-2015
- Generated \$5.3 billion of free cash flow in 2010-2015

## Cash Deployment Enhances Returns

- Invest in high return capital projects, target returns in excess of 20% for Tesoro and 15% for TLLP
- Seek to deliver Best-in-Class Return on Invested Capital

## Drive Strong Balance Sheet

- Maintain minimum cash balance of \$600 - \$800 million
- Target TSO debt to capitalization<sup>1</sup> below 30%
- Target TLLP leverage of 3 - 4 times EBITDA
- Achieve investment grade credit rating for TSO and TLLP

## Deliver Superior Shareholder Returns

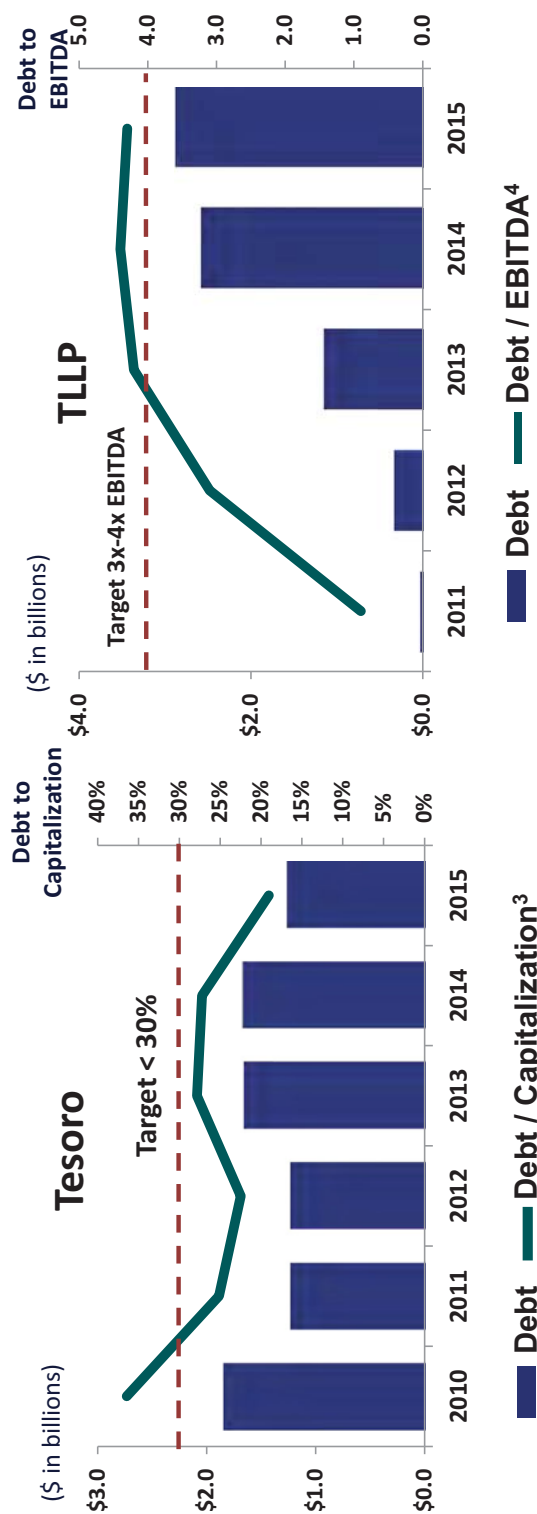
- Portfolio diversification enhances shareholder value
- Continue to grow dividends and buy back shares

1) Excluding TLLP debt and equity



# Maintaining a Strong Balance Sheet

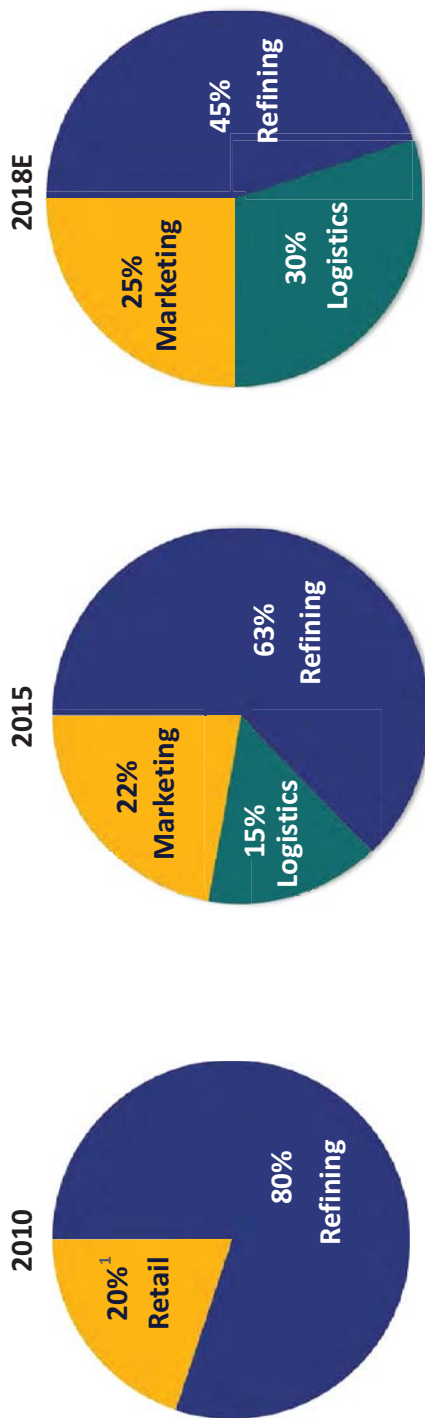
- Target TSO debt to capitalization<sup>1</sup> below 30% and TLLP leverage of 3 – 4 times
- Average cost of debt at Tesoro is 4.9% with a duration of 8.2 years<sup>2</sup>
- Average cost of debt at TLLP is 5.9% with a duration of 6.6 years<sup>2</sup>



1) Excluding TLLP debt and equity  
 2) Cost of debt is pre-tax and issuance duration is weighted average  
 3) Debt to capitalization ratio excludes TLLP total debt and non-controlling interest  
 4) As defined in TLLP's Credit Agreement (Pro Forma)

# Portfolio Transformation Underway

EBITDA Composition



- **Integrated business model** is essential to Tesoro’s growth
- Diversified portfolio expected to have **lower earnings volatility** and improved returns on capital
- Tesoro expects to create **the most diversified earnings portfolio** among independent refining peers

1) Retail as reported in 2010

# Non-GAAP Financial Measures

<i>(In millions) Unaudited</i>	EBITDA Reconciliation	
	2010	2015
<b>Net earnings attributable to Tesoro Corp</b>		
Add (earnings) loss from discontinued operations	\$ (29)	\$
Add income tax expense	4	1,690
Add interest and financing costs, net	154	4
Add depreciation and amortization expense	422	936
<b>EBITDA</b>	<b>551</b>	<b>217</b>
		756
		<b>3,603</b>

<i>(In millions) Unaudited</i>	Projected Annual EBITDA			
	LA Refinery Integration and Compliance Project	Vancouver Energy	Mixed Xylene	Isomerization
<b>Projected net earnings</b>	\$ 52	\$ 59	\$ 56	\$ 22
Add income tax expense	32	36	34	14
Add depreciation and amortization expense	16	5	10	4
<b>Projected EBITDA</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>40</b>

# Non-GAAP Financial Measures

	Free Cash Flow Reconciliation					Total
	2010	2011	2012	2013	2014	
<b>Net cash flow from operating activities</b>	\$ 385	\$ 689	\$ 1,585	\$ 859	\$ 1,364	\$ 2,131
Less sustaining (maintenance and regulatory) capital	(248)	(203)	(206)	(281)	(354)	(454)
<b>Free Cash Flow Before Dividends and Distributions</b>	\$ 137	\$ 486	\$ 1,379	\$ 578	\$ 1,010	\$ 1,677
						\$ 5,267

(In millions) Unaudited

## Tesoro Logistics LP Distinctive Growth Strategy Annual Projected EBITDA<sup>(1)</sup> 2017E

(In millions) Unaudited

	Consolidated Total
<b>Projected net earnings</b>	\$ 650
Add interest and financing costs, net	175
Add depreciation and amortization expense	175
<b>Projected EBITDA <sup>(2)</sup></b>	\$ 1,000

1) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation

2) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range

# Non-GAAP Financial Measures

*(In millions) Unaudited*

Marketing segment operating income  
Add depreciation and amortization expense  
Marketing Segment EBITDA

Marketing Segment EBITDA Reconciliation	
2010	2014
\$	244
	\$
	553
	37
	42
\$	281
	\$
	595

*(In millions) Unaudited*

Projected Marketing segment operating income  
Add depreciation and amortization expense  
Projected Marketing Segment EBITDA <sup>(1)</sup>

Projected Marketing Segment EBITDA Reconciliation		
2015	2016E	2018E
\$	899	\$
	46	632
		\$
		959
		43
		41
\$	945	\$
		675
		\$
		1,000

*(In millions) Unaudited*

Projected normalized Marketing segment operating income  
Add depreciation and amortization expense  
Projected Normalized Marketing Segment EBITDA

Projected Normalized Marketing Segment EBITDA Reconciliation	
2015	2015
\$	605
	45
\$	650

*(In millions) Unaudited*

Projected Marketing segment acquisitions operating income  
Add depreciation and amortization expense  
Projected Marketing Segment acquisitions EBITDA <sup>(1)</sup>

Projected Marketing Segment Acquisitions EBITDA Reconciliation	
2015-2018E	2015-2018E
\$	233
	17
\$	250

## Tesoro aims to increase throughput of domestic crude over the next few years.

**Investment Thesis** 07/24/2013

Tesoro has embarked on a multiyear plan to improve its profitability, including increasing spending to support larger income improvement projects. The most significant of those, including capacity expansions and rail facilities, aim to take advantage of domestic crude discounts. Additionally, the firm will continue to expend capital on several hundred small income-generating projects, which could drive earnings improvement as well.

We think, however, the biggest area of opportunity for Tesoro to improve its profitability is by increasing processing of discount crude, particularly in its primary market of California, where operating conditions remain challenging. The company is highly leveraged to developments within the state and that will only increase with its proposed acquisition of BP's BP Carson refinery. Operating in California can be advantageous because West Coast margins typically fetch a premium given the state's relative isolation from outside sources of refined product and specialized gasoline blends. However, of late it's proven to be more of a disadvantage given that the poor economic health has taken a toll on refined product demand. Potentially more troublesome for Tesoro, however, will likely be recently implemented environmental legislation, which could eventually result in increased costs or higher capital spending.

To address these challenges, Tesoro is focusing on improving yields and lowering operating costs at its facilities while increasing export volumes to higher value markets. To improve yields, Tesoro replaced a vacuum distillation unit at its Wilmington facility, which should allow it to upgrade petroleum coke to clean products.

Increasing throughput of light and heavy discount crude from the Mid-Continent and Canada via rail will likely benefit Tesoro more, though. To this end, Tesoro recently entered an agreement to develop a 120 mb/d crude by rail and marine facility in Washington. The facility should be operational in 2014 and affords Tesoro the flexibility to send light or heavy crude to its California refineries. Tesoro's California refineries should realize higher margins and improved returns through lower feedstock costs and improved yields while expending little capital.

The increased availability of discount crude bolsters the potential for the Carson acquisition despite the increased exposure to California. Specifically, Tesoro can dramatically improve the performance of Carson by optimizing its crude slate with light crude from the Bakken. Also, on its face the deal looks like a winner for Tesoro given the relatively attractive valuation of the refinery and the collection of associated midstream assets that can be dropped down to Tesoro Logistics TLLP. Tesoro should gain further advantages from integrating Carson with the Wilmington refinery.

In the Pacific Northwest, Tesoro's two refineries, which account for almost 30% of total capacity, are at a disadvantage because of their lack of cokers, resulting in poor yields and large amounts of fuel oil. However, Tesoro's recently completed project to rail upward of 50,000 bpd of discount, light Bakken crude to its Washington refinery, should lead to reduced dependence on waterborne crude and improved margins. Even if Bakken discounts narrow, the project makes economic sense solely on the yield improvement from processing the higher-quality crude.

In the Mid-Continent, Tesoro has plans to expand its existing feedstock advantage. Its North Dakota refinery already realizes lower feedstock costs by processing discount Bakken crude. To lower costs further, Tesoro plans to build out its crude-gathering system, which should reduce trucking costs and provide access to more suppliers. Also, in order to take advantage of the new infrastructure, Tesoro recently expanded its North Dakota facility by 10,000 bpd. We think the project should produce attractive returns on capital given the relatively low cost of the expansion--\$3,500 per barrel--and the fact that it will increase Tesoro's exposure to strong Mid-Continent margins.

### Morningstar's Take TSO

Analyst		
Price	Fair Value Estimate	Uncertainty
05-22-2014		Very High

**Economic Moat**  
Narrow

#### Bulls Say

- Tesoro will increase the flow of discount crude to the West Coast by 325 mb/d over the next few years, resulting in lower cost feedstock and improved yields.
- The Carson acquisition essentially paid for itself thanks to the associated logistics assets. Not only did Tesoro add cheap capacity, but integration with the Wilmington refinery should lower costs.
- Expansion of marketing channels should allow Tesoro to increase sales volumes and run its refineries at higher levels of capacity utilization.

#### Bears Say

- Legislation designed to curb carbon emissions may target refiners and result in higher costs and significant capital requirements.
- Tesoro should benefit from increased supplies of domestic crude, but its realized discounts will be less than Mid-Continent and Gulf Coast peers while also being most at risk.
- The acquisition of Carson increases leverage to California where demand remains weak and excess refinery capacity results in periods of oversupply and lower margins.

Tesoro is also investing in expansion at the Utah refinery. While total additional capacity will only increase by 4,000 bpd, processing of discount black wax crude, a locally produced cost-advantaged feedstock, should double. Additionally, Tesoro has secured marketing agreements that should increase sales volumes and allow for increased capacity utilization at the two refineries.

Tesoro's Hawaii refinery has typically underperformed its other assets because of high costs and unfavorable sales contracts. Tesoro closed the facility in April, which should free up about \$300 million in working capital associated with the refinery.

#### **Economic Moat** 07/24/2013

Tesoro's refining capacity is concentrated in California. As a result, it has not realized the benefit of the ongoing Mid-Continent discounts that many of its peers have. However, it does have two Mid-Continent refiners that have benefited, including the only refinery in the Bakken region. That said, past and future investments as well as the addition of infrastructure should allow it to capture amounts of cost-advantaged feedstock similar to its peers, although the discounts may not be as wide. First, it has invested to expand capacity at its two Mid-Continent refineries to process greater amounts of discount light crude. Second, it has invested in rail facilities to move 50 mb/d of Bakken crude west to its Anacortes, Wash., refinery, which has resulted in improved yield and margins. Finally, we expect the imbalance between light and heavy crude in the Mid-Continent will create an opportunity and economic incentive to rail both types of crude to its three California refineries, increasing their throughput of cost-advantaged crude. In fact, Tesoro already has plans in place to do so. As a result, we see overall margins improving to close to \$16/bbl over the next five years from \$11/bbl during the last cycle in 2006-10. Returns on capital should improve over the same time periods as well, increasing to 15% from 12%. As a result, we think Tesoro earns a narrow economic moat.

Outside of feedstock improvement, Tesoro's profitability should improve thanks to the acquisition of BP's Carson refinery and the closure of its Hawaii refinery. The addition of Carson and its integration with Tesoro's Wilmington refinery should lower costs and better position the company to deal with increasing environmental regulation. The addition of Carson should also increase Tesoro's system complexity to 10.5 from 9.8, including Hawaii. The Hawaii refinery has struggled in the past as it relies on high-cost crude imports for feedstock, unfavorable supply contracts, and overcapacity in the state. Its closure should improve the company's overall profitability and returns.

#### **Valuation** 07/24/2013

We are maintaining our fair value estimate of \$70 after updating our refining margin deck. Our long-term outlook for the WTI-Brent differential is \$10 and the LLS-Brent differential is \$4. We forecast long-term light crude differentials to Brent of \$2 on the West Coast. We assume long-term refining margins of \$11 and forecast realized margins based on historical capture rates. While our valuation is primarily dependent on our DCF, we also incorporate SOTP and a multiples analysis to better capture the value of Tesoro's ownership in TLLP. Our fair value estimate implies a multiple of 4.0 times our 2014 EBITDA forecast of \$2.3 billion, which assumes deal approval and includes a half-year of Carson results.

For our DCF valuation, we have modeled a slight deterioration in refining margins from the currently lofty levels to midcycle levels over our forecast period. However, we do anticipate midcycle levels to be higher than in the past for Tesoro given the improvement initiatives and availability of discounted light crude.

Tesoro still faces daunting challenges in its key market of California, where high levels of unemployment persist. Historically, Tesoro benefited from premium West Coast margins, but those premiums have narrowed in recent years. Further narrowing will likely have a negative effect. Our valuation assumes increased economic activity as well as additional marketing arrangements resulting in slightly higher utilization rates and volume growth. Also, we include only moderate increases in production costs per barrel thanks to continued weak natural gas prices. Continuation or worsening of economic conditions could threaten future profitability or volume growth.

**Risk** 07/24/2013

Success in the refining business is primarily a function of the difference in the amount the refiner pays for oil and the amount at which it sells the refined product. As such, the short- and long-term risks are dependent on movements in the prices of crude oil and gasoline or diesel. Supply interruptions or increased demand that drive up oil prices, as well as demand destruction or economic slowdown that depress gas prices, are the primary risks. Additionally, the recent strong operating performance is attributable to wide crude differentials. Significant narrowing or elimination of these differentials would negatively affect future performance. Any extended turnaround or shutdown because of an accident will also damage financial performance. In some cases, accidents can result in injury or punitive monetary damages from authorities. Legislation designed to curb carbon emissions could prove costly, particularly in California, where efforts have progressed quicker than the rest of the country.

**Management** 04/16/2013

Bruce Smith retired as chairman and CEO in 2010, and the company named Greg Goff to take his place. Goff previously served as a senior vice president for the commercial segment at ConocoPhillips COP. He brings extensive experience to the position after serving in various roles throughout ConocoPhillips' global downstream operation for almost 30 years. Goff took steps early on in his tenure to review companywide performance and identify areas of improvement. The result is a series of projects designed to boost EBITDA over the next few years. He also initiated the spin-off of Tesoro's midstream assets into an MLP. While we applaud these early efforts, ultimately execution and improved financial results will determine Goff's success.

That said, his tenure so far is a success. While market conditions have provided a tailwind, execution of improvement projects have added to performance. Meanwhile, Tesoro's ongoing efforts to identify projects to capitalize on the changing domestic crude market should lead to further improvement. As conditions improved, Goff has remained focused on shareholder returns by reinstating the dividend and repurchasing shares. Though capital spending has increased, the investments are in projects that we think will ultimately create shareholder value.

The acquisition of Carson could prove savvy considering the valuation and given the ability to offload logistics assets to Tesoro Logistics to finance the deal while increasing the value of both firms. However, it also amounts to a doubling down on California, where the economic outlook remains shaky and environmental regulations that could increase costs remain unknown. As a result, it may be a while before we know how good the deal is, but at this stage it looks like a winning move by Goff for shareholders.

**Overview****Profile:**

Tesoro is engaged in the refining and retail marketing of refined petroleum products. The company operates seven refineries with a total crude oil capacity of 850,000 barrels per day after the acquisition of BP's 266 mb/d Carson refinery and the shutdown of its Hawaii refinery. Tesoro also operates more than 850 retail fuel outlets in the Western and Mid-Continental United States.

S&P 500 Index data: S&P 500 Copyright © 2014

All data from Morningstar except U.S. intraday real-time exchange quotes, which are provided by BATS when available. End-of-day quotes for Nasdaq, NYSE, and Amex securities will appear 15 minutes after close. Graph times are Eastern Standard. © Copyright 2014 Morningstar, Inc.



## Chapter 1

## **Project Background and Purpose and Need**

### **1.1 INTRODUCTION**

Tesoro Savage Petroleum Terminal LLC (the Applicant) is proposing to construct and operate the Vancouver Energy Distribution Terminal Facility (the Facility, or the Project) at the Port of Vancouver (Port) in Vancouver, Washington, located on the Columbia River. The proposed Facility would be a crude oil terminal capable of receiving an average of 360,000 barrels of crude oil per day by train, storing it onsite, and loading it onto marine vessels. The Applicant anticipates that crude oil loaded onto marine vessels at the proposed Facility would be delivered to refineries primarily located on the US West Coast.<sup>1</sup> A map showing the Project area location is presented on Figure 1-1.

### **1.2 PROJECT OVERVIEW**

Crude oil would be delivered to the proposed Facility by railroad within “unit trains” composed of up to 120 sole-purpose crude oil tank cars. Existing railroad tracks belonging to the Burlington Northern Santa Fe (BNSF) railroad (a Class I Railroad) would be used to transport the crude oil from its source to the Port.<sup>2</sup> The proposed Facility could receive crude oil from any source with rail access to the Port; however, according to information provided by the Applicant, the most likely sources would be northern mid-continent crude oil produced in North Dakota, Montana, and the provinces of Alberta and Saskatchewan, Canada. An average of four unit trains per day would arrive at the proposed Facility.

Crude oil would be unloaded from the unit trains and pumped through transfer pipelines to a storage area containing six aboveground storage tanks. The crude oil would then be transferred via pipeline from the storage tank area to a marine terminal on the Columbia River where it would be loaded onto marine vessels. Occasionally, crude oil would be pumped directly from unit trains to marine vessels. The marine vessels would transit down the Columbia River to the Pacific Ocean and on to receiving refineries. The Applicant estimates that the total capital cost of the proposed Facility is approximately \$210 million, which includes both capital and construction costs.

### **1.3 THE APPLICANT**

Tesoro Refining & Marketing Company LLC, a subsidiary of Tesoro Corporation, and Savage Companies have entered into a joint venture as Tesoro Savage Petroleum Terminal LLC. Tesoro Savage Petroleum Terminal LLC is seeking a Site Certification Agreement (SCA) to construct and operate the proposed Facility at the Port. An Application for Site Certification (ASC) is required before an SCA can be considered. The Applicant would own the crude oil unloading facilities, transfer pipelines, storage tanks, and marine loading facilities consistent with the terms in the existing land lease agreement with the Port. Savage Companies would oversee and manage Facility design, construction, and operation on behalf of both parties.

<sup>1</sup> Receiving refineries could include those located in Alaska, Hawaii, California, and Washington.

<sup>2</sup> Union Pacific also has operating rights over portions of the BNSF track and could deliver crude oil to the proposed Facility.



February 27, 2014

# Forward Looking Statements



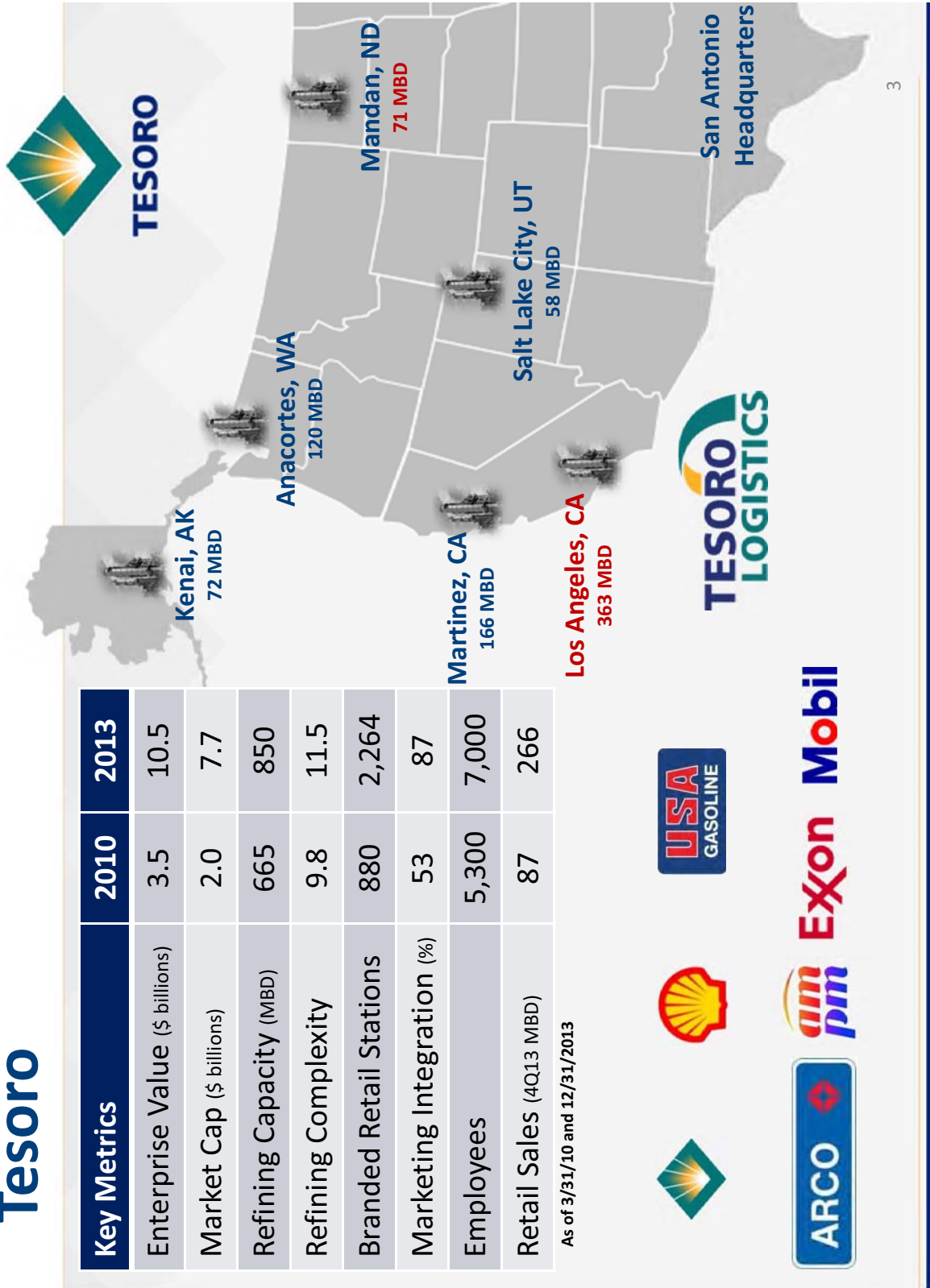
**TESORO**

- This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to, among other things:
  - The execution and effects of our strategic priorities, including achieving improvements in operational efficiency and effectiveness including safety performance, developing commercial excellence, and maintaining financial discipline and a high performing culture;
  - The market outlook, including expectations regarding crude oil production growth, feedstock costs, differentials, spreads, import and export opportunities, the Tesoro index and the anticipated costs of crude movements;
  - The timing, value and type of expected synergies from our acquisition of BP's Southern California refining and marketing business in June 2013 and the capital expenditures needed to realize such synergies, as well as our California emissions and the impact of the California regulatory environment;
  - Tesoro's competitive position and competitive advantages, including its advantaged feedstock position, the costs, benefits and timing of projects designed to enhance gross margin capture, earnings diversification and marketing optimization through brand expansion and growth;
  - West Coast logistics development, transportation advantages and refining system opportunities;
  - The timing and results of Tesoro's disciplined improvement program;
  - The results of Tesoro's logistics growth strategy, including plans for Tesoro Logistics LP ("TLLP"), the potential value of possible future asset sales to TLLP, TLLP's organic growth opportunities, the value to Tesoro of distributions from TLLP, the implied enterprise value of TLLP and the value of Tesoro's stake in TLLP;
  - Maintenance of Tesoro's financial priorities, including balance sheet strength, Tesoro's target debt capitalization, and TLLP's target debt to EBITDA level;
  - Capital expenditures, turnaround spending, and the cost, timing and return on capital projects, including expectations regarding incremental EBITDA improvements;
  - Expectations regarding free cash flow, the implementation of Tesoro's cash strategy and the return of excess cash flow to shareholders through dividends and share repurchases; and
  - Growth opportunities for both Tesoro and TLLP.
- We have used the words "anticipate", "believe", "could", "expect", "estimate", "intend", "may", "plan", "predict", "project", "should", "will" and similar terms and phrases to identify forward-looking statements in this Presentation.
- Although we believe the assumptions upon which these forward-looking statements are based are reasonable, any of these assumptions could prove to be inaccurate and the forward-looking statements based on these assumptions could be incorrect. Our operations and anticipated transactions involve risks and uncertainties, many of which are outside our control, and any one of which, or a combination of which, could materially affect our results of operations and whether the forward-looking statements ultimately prove to be correct.
- Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in our filings with the SEC. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this Presentation.
- We have included various estimates of EBITDA and free cash flow, each of which are non-GAAP financial measures, throughout the presentation. Please see Appendix for the definition and reconciliation of these EBITDA and free cash flow estimates.

# Tesoro

Key Metrics	2010	2013
Enterprise Value (\$ billions)	3.5	10.5
Market Cap (\$ billions)	2.0	7.7
Refining Capacity (MBD)	665	850
Refining Complexity	9.8	11.5
Branded Retail Stations	880	2,264
Marketing Integration (%)	53	87
Employees	5,300	7,000
Retail Sales (4Q13 MBD)	87	266

As of 3/31/10 and 12/31/2013

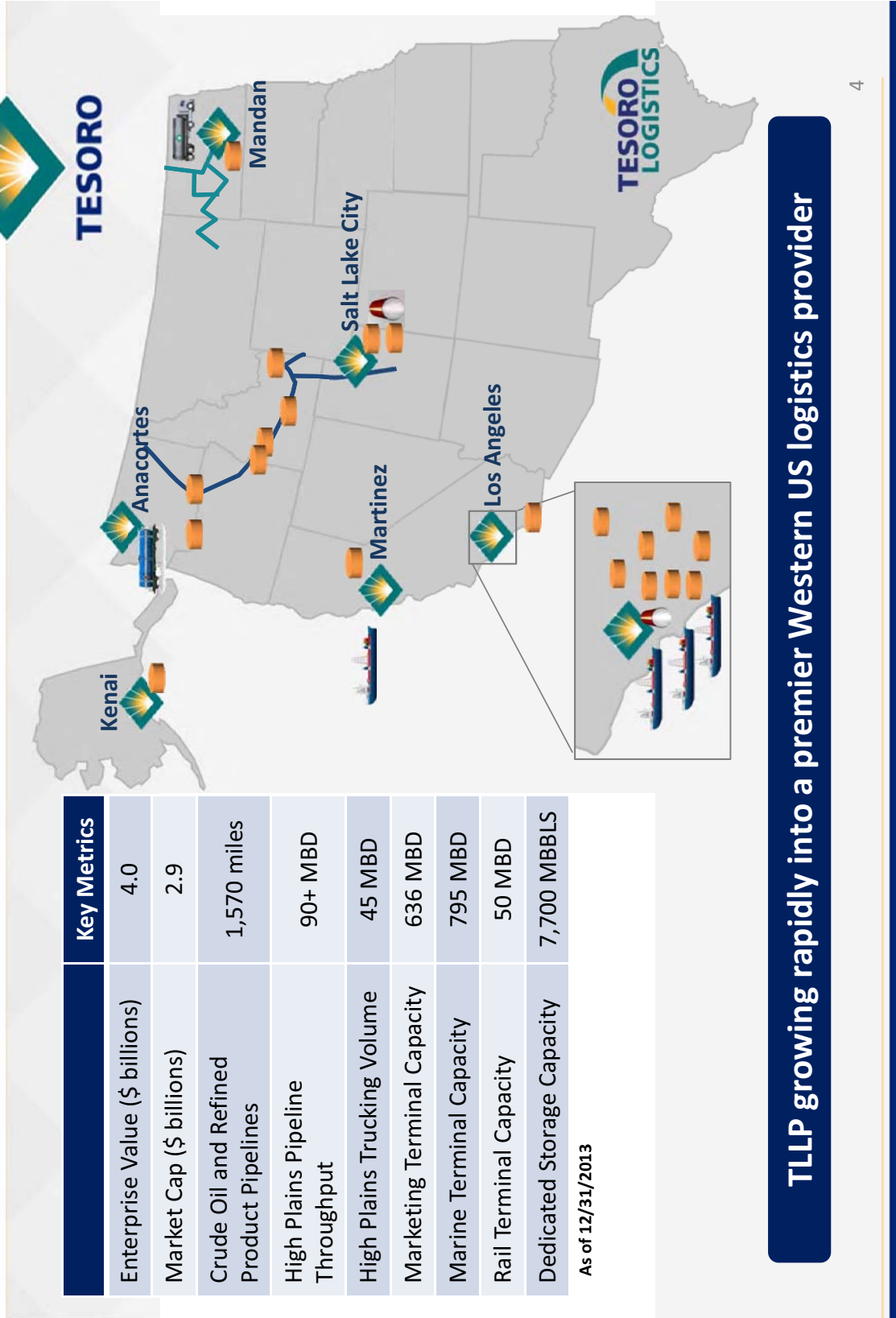


# Tesororo Logistics LP



	Key Metrics
Enterprise Value (\$ billions)	4.0
Market Cap (\$ billions)	2.9
Crude Oil and Refined Product Pipelines	1,570 miles
High Plains Pipeline Throughput	90+ MBD
High Plains Trucking Volume	45 MBD
Marketing Terminal Capacity	636 MBD
Marine Terminal Capacity	795 MBD
Rail Terminal Capacity	50 MBD
Dedicated Storage Capacity	7,700 MBBLS

As of 12/31/2013



**TLLP growing rapidly into a premier Western US logistics provider**

# Market Outlook - Overview



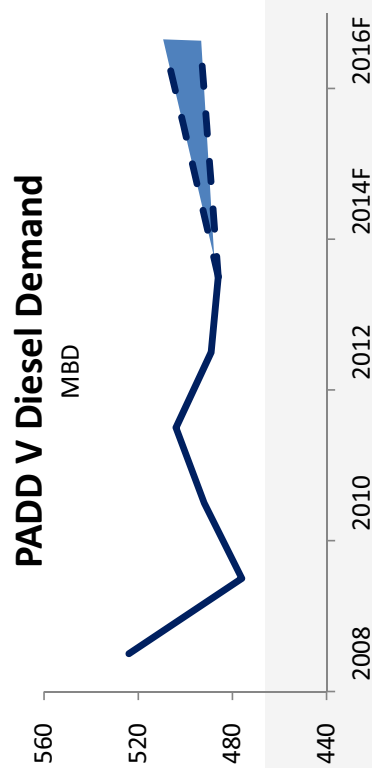
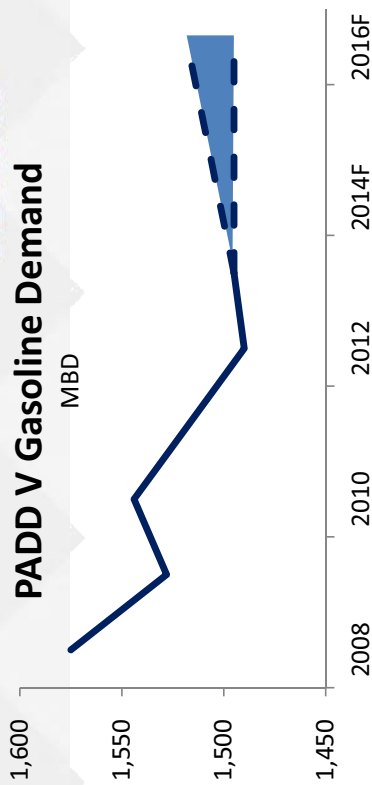
Key Drivers	Tesoro's View
Global Economic Outlook	Moderate growth
U.S. Economic Outlook	2 – 2.5% GDP growth
Global Refining Capacity	Capacity exceeds demand
U.S. Refining Utilization	High due to low feedstock and natural gas prices
U.S. Crude Oil Supply	Strong growth in North American crude oil production
World Product Demand Growth	Gasoline ~1%; diesel ~2% per year
U.S. Product Demand Growth	Gasoline flat; diesel ~1% per year
U.S. Product Exports	Strong and growing supported by U.S. competitive position
Renewable Fuel Growth	Delays in development of advanced fuels
Regulatory Environment	Challenges and uncertainty

Source: Internal Tesoro estimates.

# PADD V Fundamentals



- Gasoline demand expected to grow 0 to 0.5% annually through 2016
- Diesel demand expected to grow 1.0% annually
- Net clean product exports expected to remain 100-150 MBD
- California unemployment 8.7%, down from over 10% last year
- Tesoro's gasoline refining production is highly integrated with marketing



**West Coast economy improved and demand stabilizing**

Source: EIA monthly data, forecast based on internal Tesoro forecasts.

## Keys to Distinction on the West Coast



TESORO

- Operating cost advantage
- Flexible yield structure
- Access to cost-advantaged crude oil
- Integrated logistics infrastructure
- Secure and ratable refinery off-take
- Cost-advantaged regulatory compliance



Los Angeles acquisition transforms our capabilities



## Strategic Priorities



**TESORO**

### • Operational efficiency and effectiveness

- Safety and reliability
- Cost leadership
- System improvements

### • Commercial excellence

### • Financial discipline

### • Value-driven growth

### • High performing culture



**Enduring commitment to execution**

## Execution of Strategic Priorities



### Distinctive Performance: 2014 and 2015

- Deliver California synergies
- Enhance gross margin
- Improve the base
- Grow logistics
- Maintain financial discipline

**Targeting \$370 to \$430 million of EBITDA improvements in 2014**

# Distinctive Performance Objectives



**TESORO**

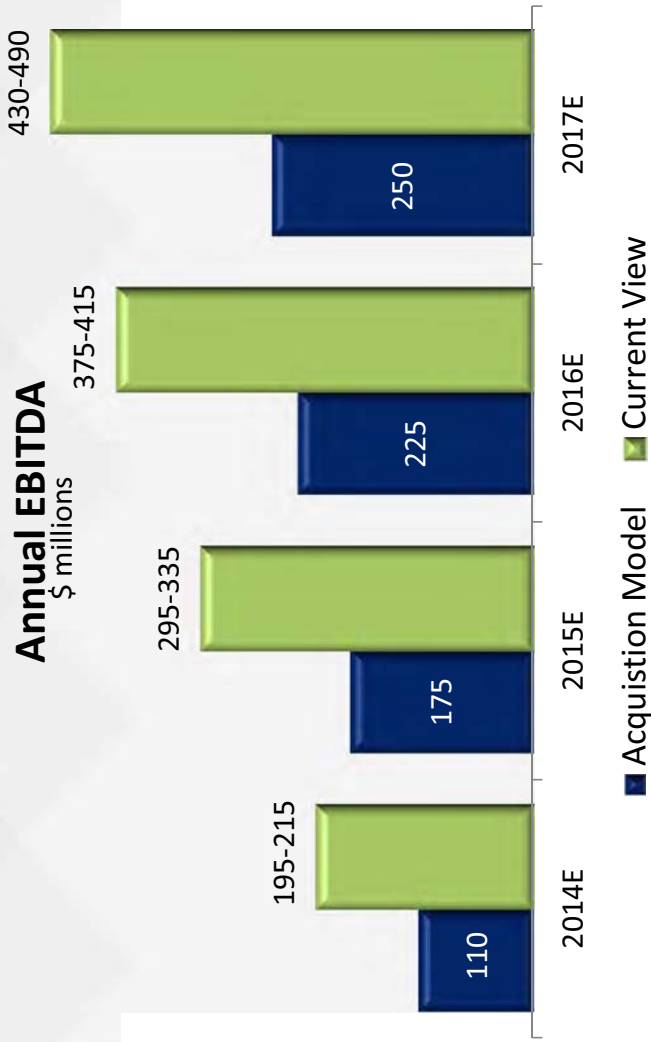
- Distinctive Performance Objectives

\$ million	2014	2015
Deliver California Synergies	160 – 180	260 – 300
Enhance gross margin	140 – 160	250 – 290
Improve the base	70 – 90	80 – 120
<b>Annual EBITDA Improvement<sup>1</sup></b>	<b>370 – 430</b>	<b>590 – 710</b>

- Grow logistics
  - Grow EBITDA by \$200 million by 2015
  - Deliver incremental Tesoro shareholder value of \$1 billion
- Maintain financial discipline
  - Maintain balance sheet strength, drive toward investment grade
  - Invest free cash flow in high-return capital projects
  - Return excess cash to shareholders

1) Improvements over 2013 results.

# California Synergy EBITDA



- Feedstock Advantage
- Logistics Optimization
- Production Optimization
- Operating Cost Improvements

**Synergy value and pace of capture significantly improved**

# California Synergy Capital Expenditures



- **Los Angeles Refinery Integration Project**

- Optimizes processing capability
- Provides 30-40 MBD product flexibility
- Reduces CO2 emission 500,000 tons per year

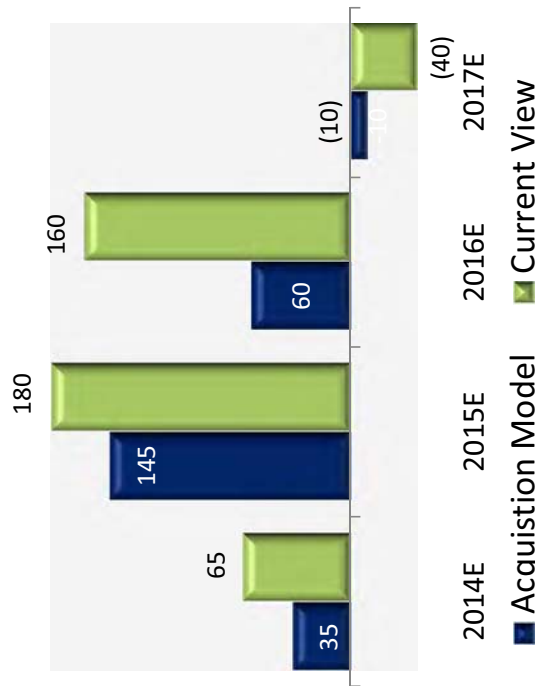
- **Logistics Projects**

- Link logistics assets
- Reduce third party fees
- Provides feedstock and product optionality

- **Processing Projects**

- Strengthen conversion capability
- Provides feedstock flexibility
- Improves product yields

**Net Capital**  
\$ millions



**Disciplined delivery of high return capital investments**

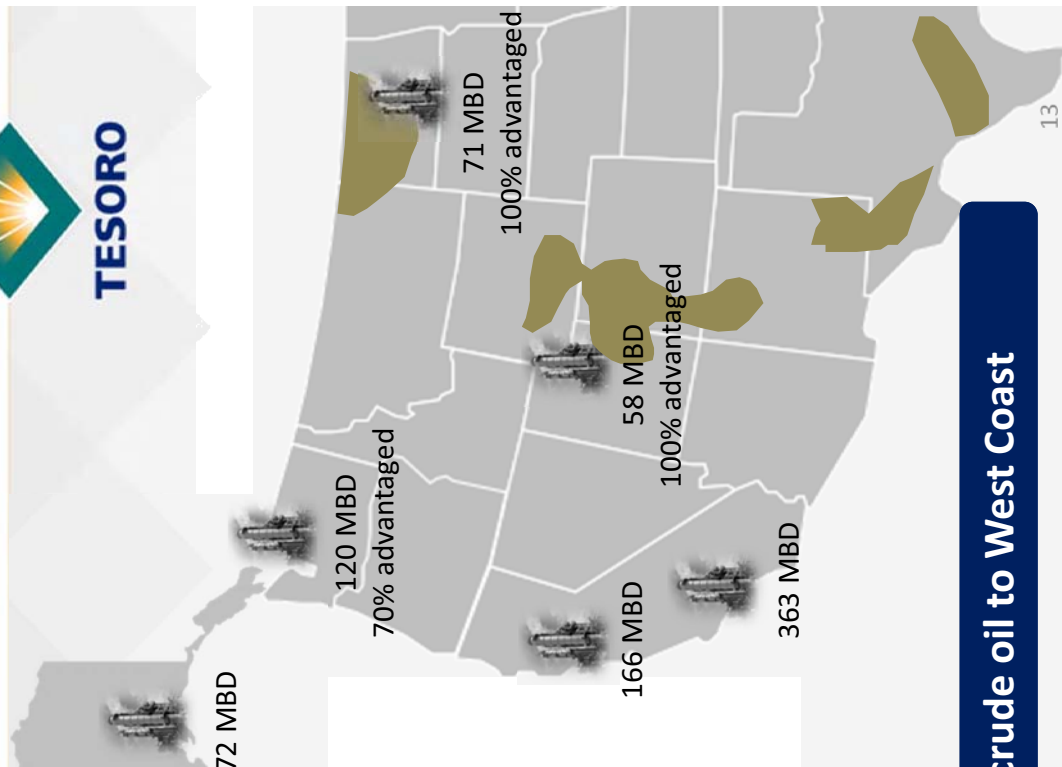
Note: Net synergy capital of ~\$375 MM (including savings beyond 2017, which are reflected in 2017E), capital plan net of capital avoidance, 2017 emissions estimate is subject to final project scope and detailed engineering.

# Tesoro's Advantaged Feedstock Opportunity



## Opportunities by Refinery

- **Kenai**
  - Currently up to 25% Cook Inlet
  - Potentially up to 67% Cook Inlet and Bakken
- **Martinez**
  - Currently up to 45% California Heavy and Bakken
  - Potentially up to 67% California Heavy and Bakken
- **Los Angeles**
  - Currently up to 15% California Heavy
  - Potentially up to 50% California Heavy and Bakken

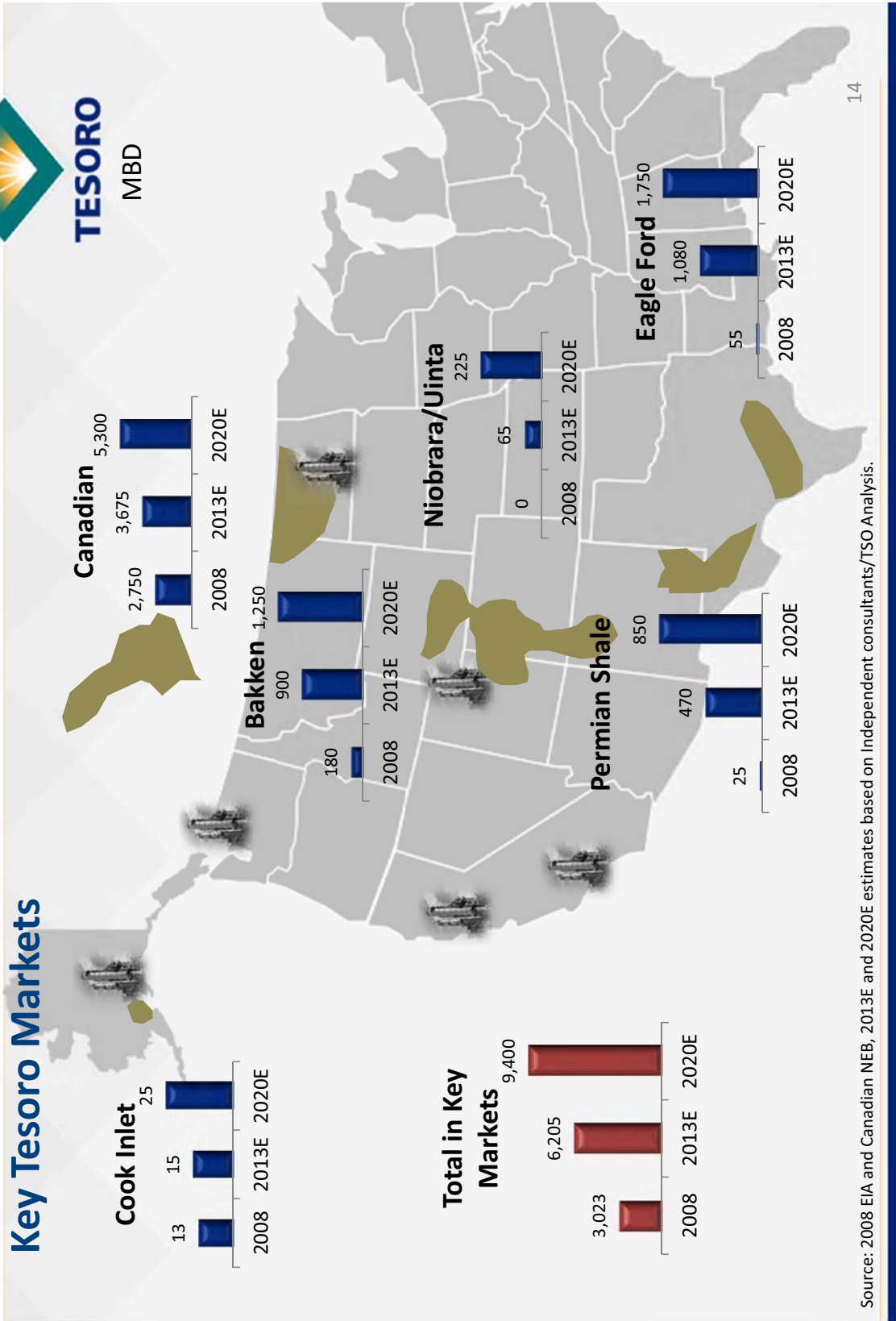


## Potential impact on ANS crude oil

- Competitive pricing
- Relative refining value

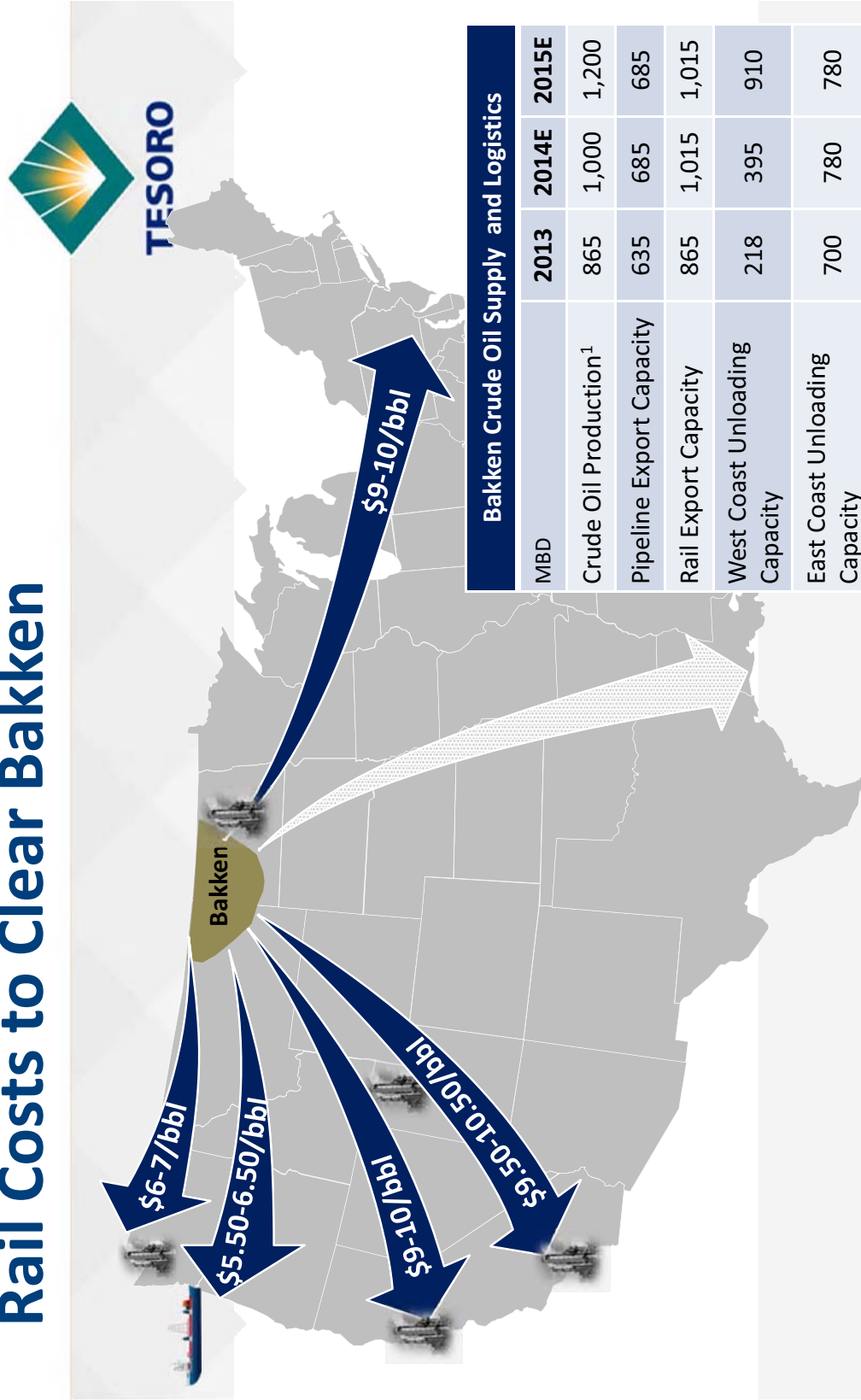
**Extending the advantaged crude oil to West Coast**

# Crude Oil Production Growth



Source: 2008 EIA and Canadian NEB, 2013E and 2020E estimates based on Independent consultants/TSO Analysis.

# Rail Costs to Clear Bakken



Bakken Crude Oil Supply and Logistics			
MBD	2013	2014E	2015E
Crude Oil Production <sup>1</sup>	865	1,000	1,200
Pipeline Export Capacity	635	685	685
Rail Export Capacity	865	1,015	1,015
West Coast Unloading Capacity	218	395	910
East Coast Unloading Capacity	700	780	780

## West and East Coasts clearing destinations for Bakken crude oil

Note: Rail cost estimates include only the railroad tariff.

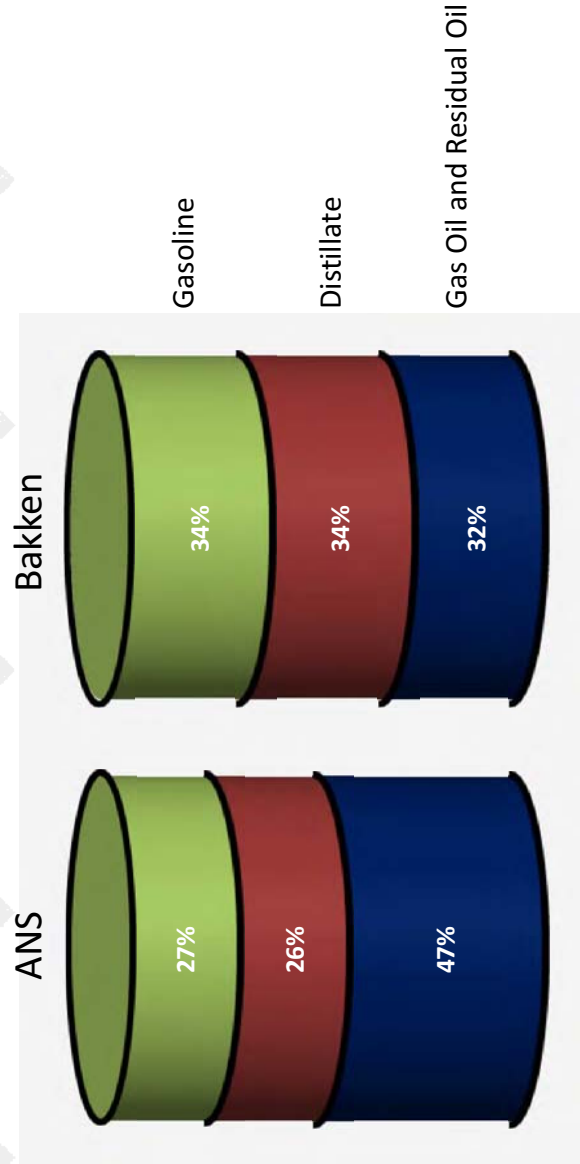
1) Average annual crude oil production, export capacity and price discount estimates based on industry consultant and Tesoro market outlook.



# Anacortes Yield Comparison



## Crude Oil Yields



**Bakken crude oil yields 14% to 16% more gasoline and distillate than ANS**

# Port of Vancouver

- Up to 300 MBD Rail-to-Marine Terminal
  - Joint venture with Savage Companies
- Port of Vancouver advantages
  - Flexibility to deliver to all West Coast refineries
  - Competitive with direct rail cost to California
  - Existing rail and marine infrastructure
- Port of Vancouver granted lease 3Q13



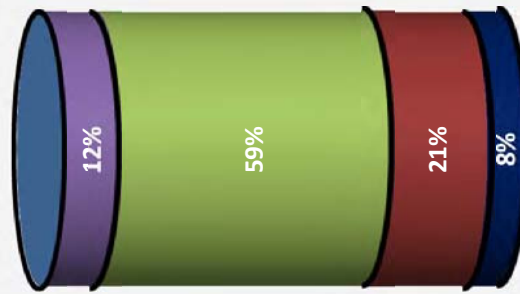
	Completed Facility
Capacity	Up to 300 MBD
Estimated Completion	4Q14 – 4Q15
Tesoro Initial Committed Capacity	60 MBD

**A premier advantaged crude oil facility for the West Coast**

# West Coast Refining System Opportunity



Tesoro Consolidated West Coast Index



Tesoro Crude Oil Throughput



Foreign Heavy  
Foreign Light  
ANS  
California  
WTI<sup>1</sup>

3Q 2013

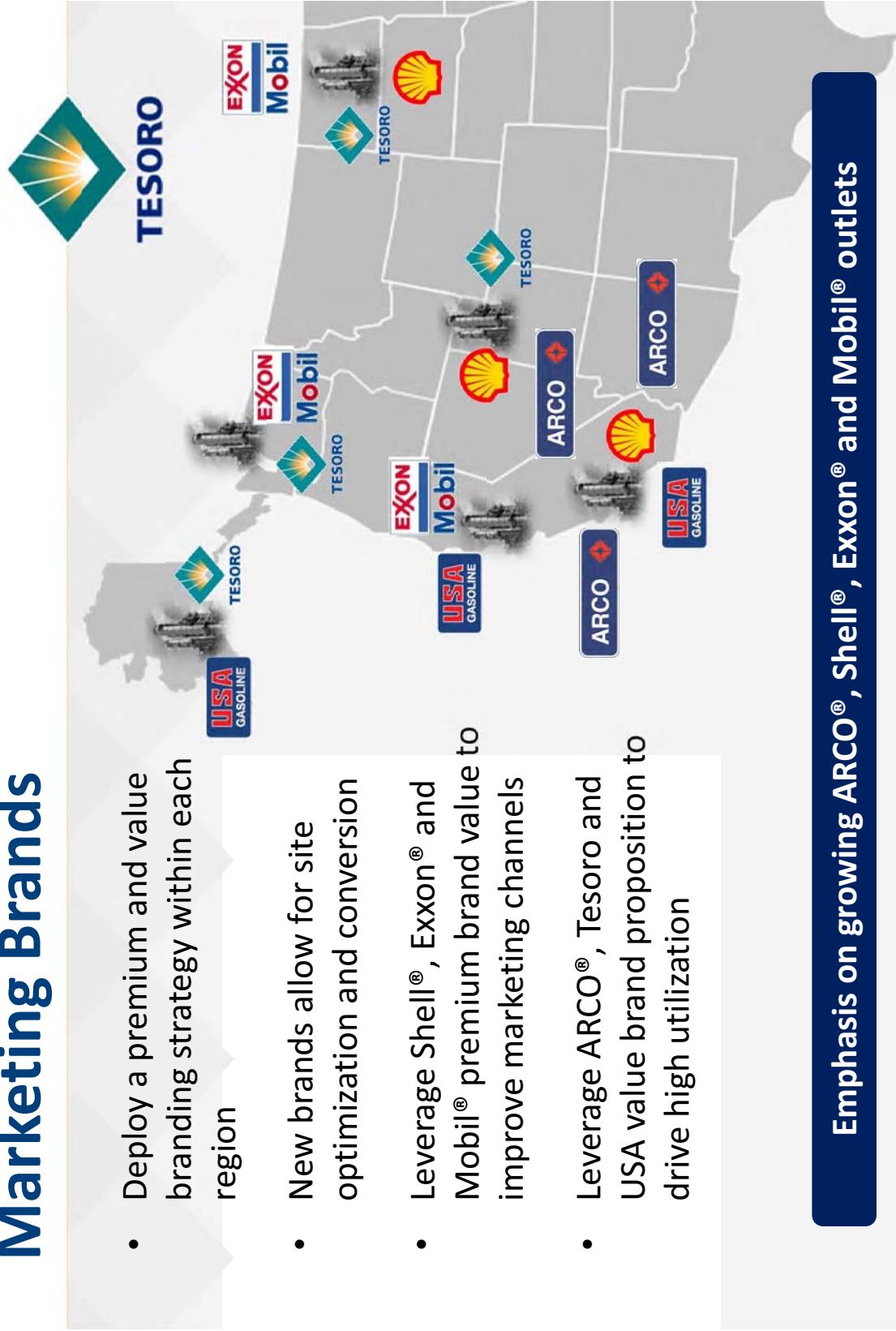
YE 2015E

**Advantage crude oil strategy enhances realized margins**

1) WTI crude oil includes all grades of N. American crude oil other than those stated in other categories.

# Marketing Brands

- Deploy a premium and value branding strategy within each region
- New brands allow for site optimization and conversion
- Leverage Shell®, Exxon® and Mobil® premium brand value to improve marketing channels
- Leverage ARCO®, Tesoro and USA value brand proposition to drive high utilization



**Emphasis on growing ARCO®, Shell®, Exxon® and Mobil® outlets**

# Solomon Based Cost Reductions



## Total Operating Expense Gap (Non-energy)<sup>1</sup>

\$/bbl	2010	2011	2012
California	1.70	1.10	0.85
Pacific Northwest	NA	0.05	0.30
Mid-Continent	0.30	0.15	1.10
<b>Weighted Average</b>	<b>1.15</b>	<b>0.55</b>	<b>0.75</b>

- Captured cost improvements in California, opportunities remain
- Mid-Continent performance reflects increased spending to strengthen long-term reliability
- Maintenance, personnel efficiency and improved reliability driving per barrel operating cost improvement

## Targeting first tercile cost position in California

1) Versus Solomon Refinery Supply Corridor (RSC) 1<sup>st</sup> tercile, Pacific Northwest adjusted in 2010 and 2011 to exclude the impact of the Anacortes incident.

# TLLP Strategic Drivers



## Focus on Stable, Fee-Based Business

- Fee-based committed businesses
- Maintain stable cash flow

## Optimize Existing Asset Base

- Increase third-party volumes
- Consolidate Tesoro business into TLLP terminals

## Pursue Organic Expansion Opportunities

- Execute growth projects
- Leverage low cost of capital

## Grow Through Strategic Acquisitions

- Pursue acquisitions that fit Western-US footprint
- Strategic partner in Tesoro's growth plan

**Increase EBITDA and cash distributions through fee-based logistics business model**

# TLLP Value Proposition to Tesoro

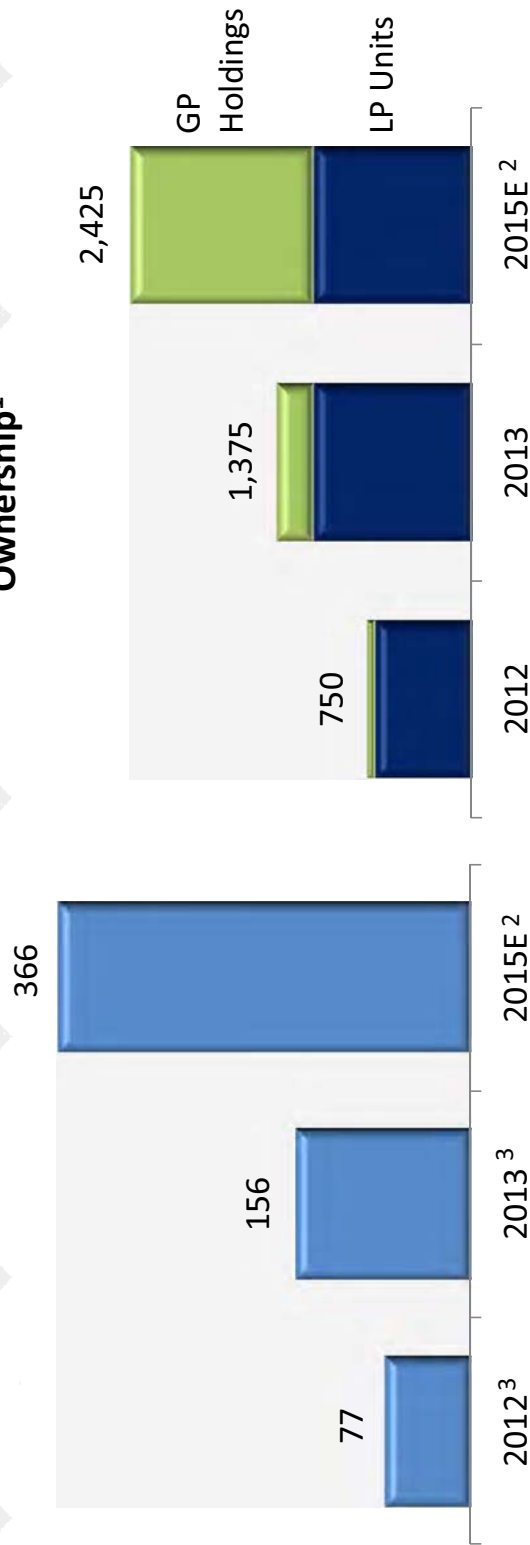


**TESORO**

\$ millions

## TLLP EBITDA

## Tesoro's Implied Value of TLLP Ownership<sup>1</sup>



Implied value per Tesoro share	\$5.50	\$10.47	\$17.20
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**TLLP's growth drives significant Tesoro shareholder value creation**

1) TSO Market Cap as of 2/19/14, LP value based on market price, GP value based on 20X distributions.  
 2) Estimates based on TLLP first call consensus EBITDA figures as of 12/31/13.  
 3) Adjusted EBITDA, excludes predecessor results

# Financial Priorities



- Maintain a minimum cash balance of \$600 to \$800 million

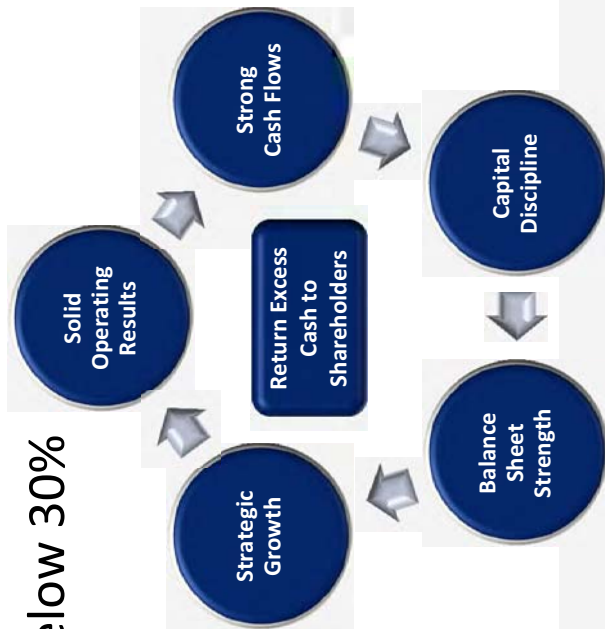
- Target TSO debt to capitalization<sup>1</sup> below 30%

- Target TLLP debt at 3x to 4x EBITDA

- Invest in growth opportunities to drive further value creation

- Return excess cash to shareholders

- Drive towards investment-grade credit rating



1) Excluding TLLP debt and equity.



# Appropriate Leverage for Growth



<i>\$ millions</i>	TSO <sup>1</sup>	TLLP <sup>1</sup>	Consolidated
Total Debt	1,665	1,164	2,829
Total Equity	4,302	1,183 <sup>3</sup>	5,485
Debt to Total Capitalization	<b>28%</b>	50%	34%
Total Debt to EBITDA <sup>2</sup>	0.8x	<b>4.1x</b>	1.4x

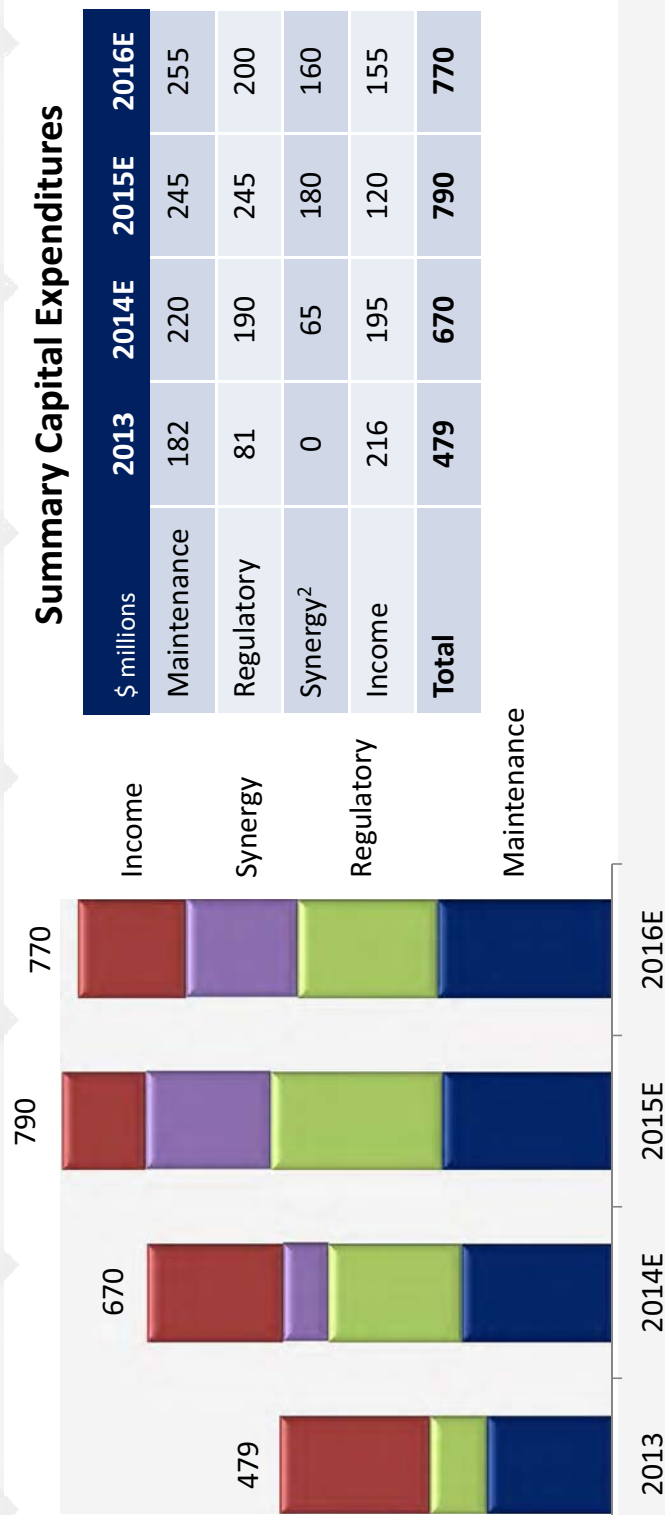
**Tesoro leverage in target range less than 8 months after Los Angeles acquisition**

- 1) As of December 31, 2013
- 2) EBITDA forecast based on latest 2014 consensus analyst research estimates of \$2.0 billion for TSO and \$287 million for TLLP
- 3) Represents non-controlling interest as of December 31, 2013

# Summary Capital Spending



Tesoro Capital Spending<sup>1</sup>  
\$ in millions



Summary Capital Expenditures

**Capital spending plans well supported by strong and growing EBITDA**

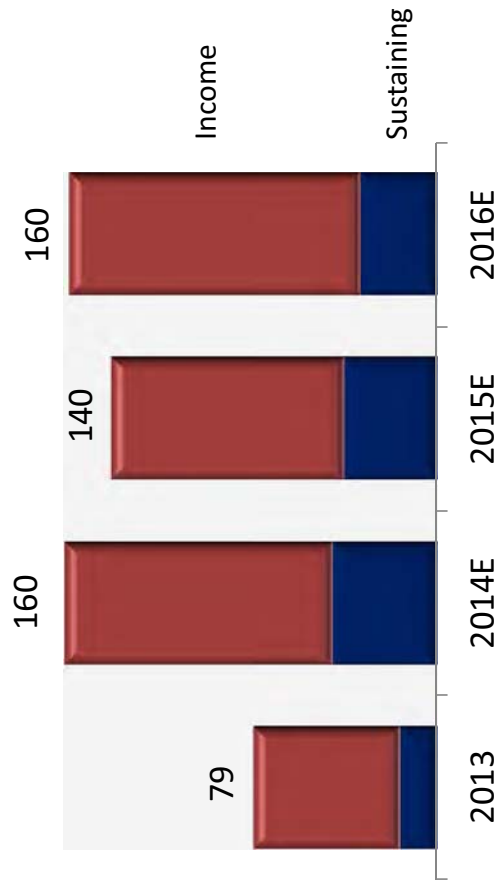
1) Excludes self-funded TLLP capital expenditures. All references to capital spending on this page are estimated.  
2) Net synergy capital.

# TLLP Capital Spending



- TLLP plans to spend about \$100 million per year on income projects

**Tesoro Logistics Capital Spend**  
\$ millions



- Typical project return of 15-25%
- Pursuing opportunities to expand gathering system
- TLLP self funds capital

**Income capital expected to support significant organic growth**

Note: Maintenance and regulatory capital before reimbursements. All references to capital spending on this page are estimated.

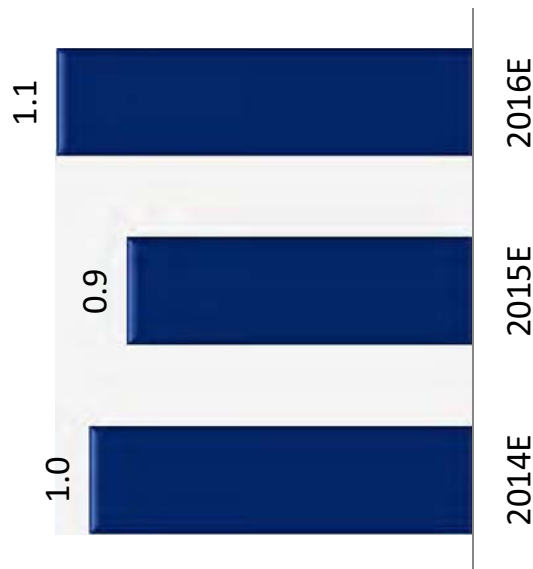
## Delivering Free Cash Flow



**TESORO**

**Free Cash Flow<sup>1</sup>**

\$ in billions



- Expect to generate approximately \$3.0 billion in free cash flow over next three years
- Before potential \$1.5 billion of further logistics asset sales to TLLP
- Plan to spend less than a third on high-return income capital projects
- Tesoro well positioned for further growth and returning cash to shareholders

**Strong financial position and significant free cash flow in 2014 and beyond**

(1) Defined as EBITDA less cash interest and taxes, sustaining capital, turnaround spending and TLLP distributions. EBITDA estimates based on consensus analyst research estimates as of November 19, 2013 and incremental improvements in this presentation above base Los Angeles synergies announced at time of acquisition. Interest, taxes, sustaining capital, turnaround spending and TLLP distributions based on Tesoro's 2014 Business Plan.

# Delivering Shareholder Value



California Synergies

Maintain Financial Discipline

Transformation through Distinctive Performance

Enhance Gross Margin

Grow Logistics

Improve the Base

# Non-GAAP Financial Measures



EBITDA represents earnings before interest and financing costs, net, interest income, income taxes, and depreciation and amortization expense. We present EBITDA because we believe some investors and analysts use EBITDA to help analyze our cash flows including our ability to satisfy principal and interest obligations with respect to our indebtedness and to use cash for other purposes, including capital expenditures. EBITDA is also used by some investors and analysts to analyze and compare companies on the basis of operating performance and by management for internal analysis. EBITDA should not be considered as an alternative to net earnings, earnings before income taxes, cash flows from operating activities or any other measure of financial performance presented in accordance with accounting principles generally accepted in the United States of America. EBITDA may not be comparable to similarly titled measures used by other entities.

## *(In millions) Unaudited*

	California Synergy EBITDA - Acquisition Model			
	2014E	2015E	2016E	2017E
Projected net earnings	\$ 67	\$ 104	\$ 133	\$ 149
Add income tax expense	41	63	82	91
Add depreciation and amortization expense	2	8	10	10
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 110</b>	<b>\$ 175</b>	<b>\$ 225</b>	<b>\$ 250</b>

## *(In millions) Unaudited*

	California Synergy EBITDA - Current View			
	2014E	2015E	2016E	2017E
Projected net earnings	\$ 127	\$ 193	\$ 239	\$ 280
Add income tax expense	75	113	141	165
Add depreciation and amortization expense	3	9	15	15
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 205</b>	<b>\$ 315</b>	<b>\$ 395</b>	<b>\$ 460</b>

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.

# Non-GAAP Financial Measures



	Gross Margin Capture Improvements EBITDA	
	2014E	2015E
<i>(In millions) Unaudited</i>		
<b>Projected net earnings</b>		
Add income tax expense	\$ 88	\$ 163
Add depreciation and amortization expense	51	96
<b>EBITDA <sup>(1)</sup></b>	11	11
	\$ 150	\$ 270

	Improve the Base EBITDA	
	2014E	2015E
<i>(In millions) Unaudited</i>		
<b>Projected net earnings</b>		
Add income tax expense	\$ 50	\$ 63
Add depreciation and amortization expense	30	37
<b>EBITDA <sup>(1)</sup></b>	0	0
	\$ 80	\$ 100

	Free Cash Flow Reconciliation		
	2014E	2015E	2016E
<i>(In billions) Unaudited</i>			
<b>Net Cash Flow from Operating Activities</b>	\$ 1.5	\$ 1.5	\$ 1.8
Less Sustaining Capital	0.4	0.5	0.5
Less TLLP Distributions	0.1	0.1	0.2
<b>Free Cash Flow</b>	\$ 1.0	\$ 0.9	\$ 1.1

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.

(2) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation.

# Non-GAAP Financial Measures



*(In millions) Unaudited*

TLLP EBITDA December 31, 2012 <sup>(2)</sup>

	Tesoro Logistics LP (Partnership)	Predecessor	Total Tesoro Logistics LP
Net earnings	\$ 57	\$ (1)	\$ 56
Add interest and financing costs, net	9	0	9
Add depreciation and amortization expense	11	2	13
<b>EBITDA</b>	<b>\$ 77</b>	<b>\$ 1</b>	<b>\$ 78</b>

**Net earnings**

Add interest and financing costs, net

Add depreciation and amortization expense

**EBITDA**

*(In millions) Unaudited*

TLLP EBITDA December 31, 2013 <sup>(2)</sup>

	Tesoro Logistics LP (Partnership)	Predecessor	Total Tesoro Logistics LP
Net earnings	\$ 80	\$ (38)	\$ 42
Add interest and financing costs, net	40	-	40
Add depreciation and amortization expense	37	6	43
Less interest income	(1)	-	(1)
<b>EBITDA</b>	<b>\$ 156</b>	<b>\$ (32)</b>	<b>\$ 124</b>

**Net earnings**

Add interest and financing costs, net

Add depreciation and amortization expense

Less interest income

**EBITDA**

*(In millions) Unaudited*

TLLP Projected EBITDA  
<sup>(2)</sup>

	2015E
Net earnings	\$ 215
Add interest and financing costs, net	75
Add depreciation and amortization expense	76
<b>EBITDA</b>	<b>\$ 366</b>

**Net earnings**

Add interest and financing costs, net

Add depreciation and amortization expense

**EBITDA**

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range. 31  
 (2) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation.



**The Proposed Negative Declaration by SCAQMD for the  
Tesoro Pipeline from its Long Beach Marine Terminal to  
New Wilmington Refinery Storage Tanks  
is Missing Major Expansion Plan Descriptions and Requires a Full EIR**

Comments of Julia E. May,  
Senior Scientist, CBE  
June 10, 2014

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- II. The Project Description is flawed – the Pipeline & Storage Tank Negative Declaration is contradicted by Tesoro’s Published Broader Plans**
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    - 1. Industry literature identified these plans
    - 2. Tesoro also published these plans
- III. Potential impacts of the Project**
  - A. Changes in crude oil feedstock associated with the Project have significant impacts
    - 1. Waxy Bakken crude oil requires special handling and creates problems of transfer in both marine vessels and refinery storage tanks and requires chemical dispersants
    - 2. Bakken crude also causes fouling of preheaters, heat exchangers, and furnaces, refinery corrosion, and can shutdown refinery units
    - 3. Bakken crude is volatile and explosive , and these characteristics were not evaluated in the ND
    - 4. Bakken crude can also increase levels of acutely hazardous and corrosive Hydrogen Sulfide in the refinery
    - 5. Another “advantaged” crude oil from Canadian Tar Sands that Tesoro plans to import also causes major impacts
    - 6. The Project Description failed to provide baseline data on the current crude oil slate, to compare it to the “advantaged” crudes the Project allows, and to identify the potentially significant impacts of such changes
  - B. Integrating the Wilmington and Carson refinery units and logistics operations is related to the Project, and has the potential to cause major impacts
  - C. Marine Loading operation changes have potential significant impacts
  - D. The increased Storage Tanks themselves have significant impacts
  - E. The Project has the potential to increase coking
  - F. The approximate mile-long expanded pipeline from the Marine Terminal to the Wilmington refinery tanks increases earthquake risk of spills
  - G. Other Potential Project Impacts
- IV. Conclusion – Potential Impacts are large, have not been mitigated, no alternatives or Cumulative Impacts were analyzed, and an EIR must be developed**

**I. Introduction**

This report evaluates the Tesoro Storage Tank Replacement and Modification Project (described hereafter as the “Project”) in Wilmington and finds that a Negative Declaration (ND) published by the South Coast Air Quality Management District should not be adopted, because the Project has broad implications for changing operations at the refinery, marine operations, in integration of the Wilmington with the Carson refinery, among other changes. These changes have significant impacts that need to be evaluated through a full Environmental Impact Report (EIR).

**II. The Project Description is flawed – the Pipeline & Storage Tank Negative Declaration is contradicted by Tesoro’s Published Broader Plans**

**A. Project description**

The ND<sup>1</sup> describes the Project as merely a way to offload products faster, to speed getting ships out of harbor, unrelated to other transportation and refinery operations. For example, it states:

*Description of Nature, Purpose, and Beneficiaries of Project: The Tesoro Refining & Marketing Company LLC (Tesoro) is proposing a storage tank replacement and modification project at its Los Angeles Refinery – Wilmington Operations to increase the amount of crude oil that can be stored, and to increase the efficiency of the crude oil deliveries from ships. . . .*

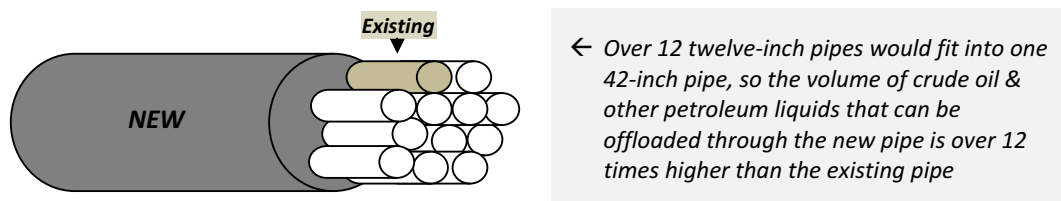
The ND describes very large storage expansion (440,000 bbls per day increase for two tanks, plus increased throughput of 150,000 bbls/month for one tank), and changes in materials stored:

	Current size	Proposed size	Permitted Materials Stored	Proposed Materials Stored
<b>Tank 80035</b> - Fixed to Internal floating roof	80,000 bbl	300,000 bbl	Petroleum materials including crude oil, hydrocracking unit (HCU) feedstock (a light gas oil); currently primarily stores HCU feedstock (ND p. 1-1)	Light & heavy crude oils of varying vapor pressures up to 11psi, light gas oils (such as HCU feedstock & FCCU Feedstock), & heavy gas oils, but ND also states these will primarily store crude oil
<b>Tank 80036</b> - Fixed to Internal floating roof	80,000 bbl	300,000 bbl		
<b>Tank 80038</b> Fixed roof w/out vapor recovery, connect to vapor recovery	80,000 bbl	No size change	Petroleum distillate w/true vapor pressure <0.5psi such as crude oil & heavy gas oils, currently primarily stores vacuum gas oil (heavy)	Change types of materials stored to also include light gas oil
<b>Tank 80079</b> Internal floating roof tank	80,000 bbl	Same size, but increased throughput from 350,000 to 500,000 bbls/month	Petroleum distillate w/true vapor pressure <7.6psi such as crude oil, heavy gas oils, light gas oils, diesel fuel, primarily stores crude oil	No change in types of materials permitted to be stored

<sup>1</sup> Negative Declaration at p. 2-1, and Notice of Intent to Adopt a Draft Negative Declaration, Tesoro Storage Tank Replacement and Modification Project, at 2<sup>nd</sup> page.

No specific baseline data is provided on the current materials actually stored in the tanks.

The description also proposes greatly increased pipe sizing (from a 12-inch diameter pipe, to a 42-inch pipe) for delivery of crude oil and other materials from the Marine Terminal to these storage tanks. The volume of material that can be delivered through a pipe is dependent on cross-sectional area; the 42-inch pipe would allow a delivery increase of over 12 times the volume currently able to be delivered.<sup>2</sup>

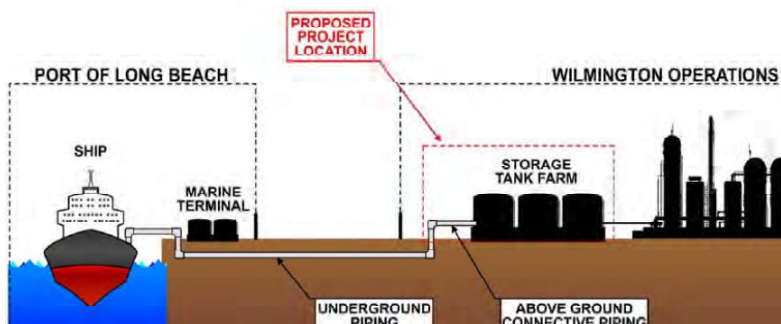


The description incorrectly concludes there will be no significant impacts, and counter to Tesoro’s public statements documented later, there will be no changes in materials delivered:

*No changes to the type of materials delivered to the Wilmington Operations are proposed. The following environmental topic areas were identified as having the potential to be affected by the proposed project: air quality and greenhouse gas emissions; energy; geology and soils; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and transportation and traffic. However, the analysis of these environmental topic areas in the Draft Negative Declaration (ND) concludes that the proposed project would not generate any significant adverse environmental impacts.*

But the changes described above have the potential for major operational debottlenecking and changes in materials (e.g. crude oil) delivered, with associated impacts described below. Furthermore, Tesoro has publicly announced such changes outside of the ND process.

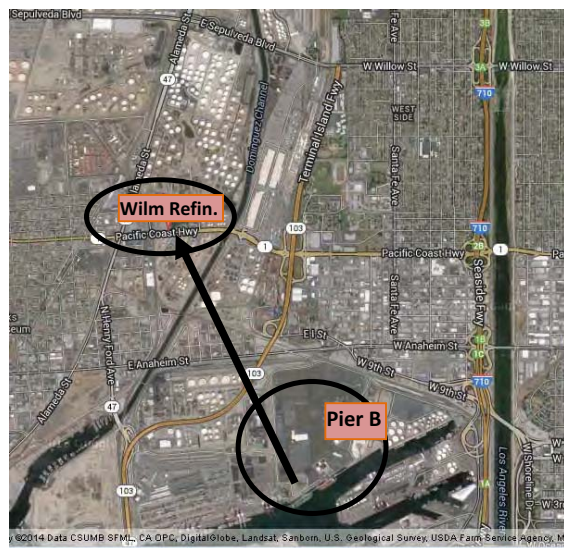
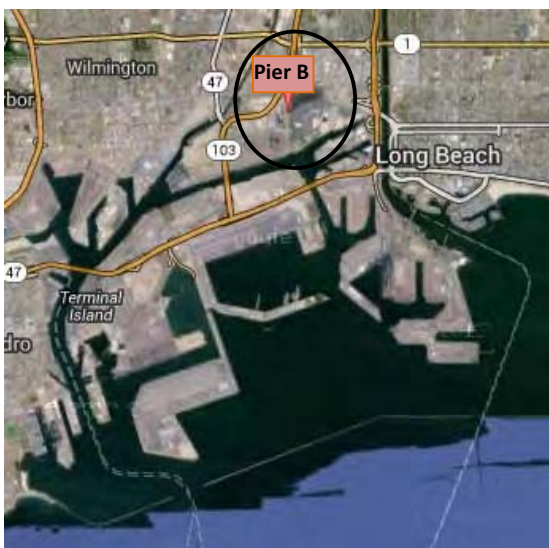
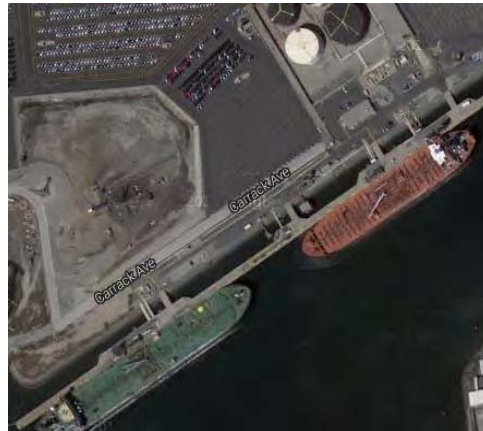
The following graphic of the project was provided in the ND (at p. 1-10):



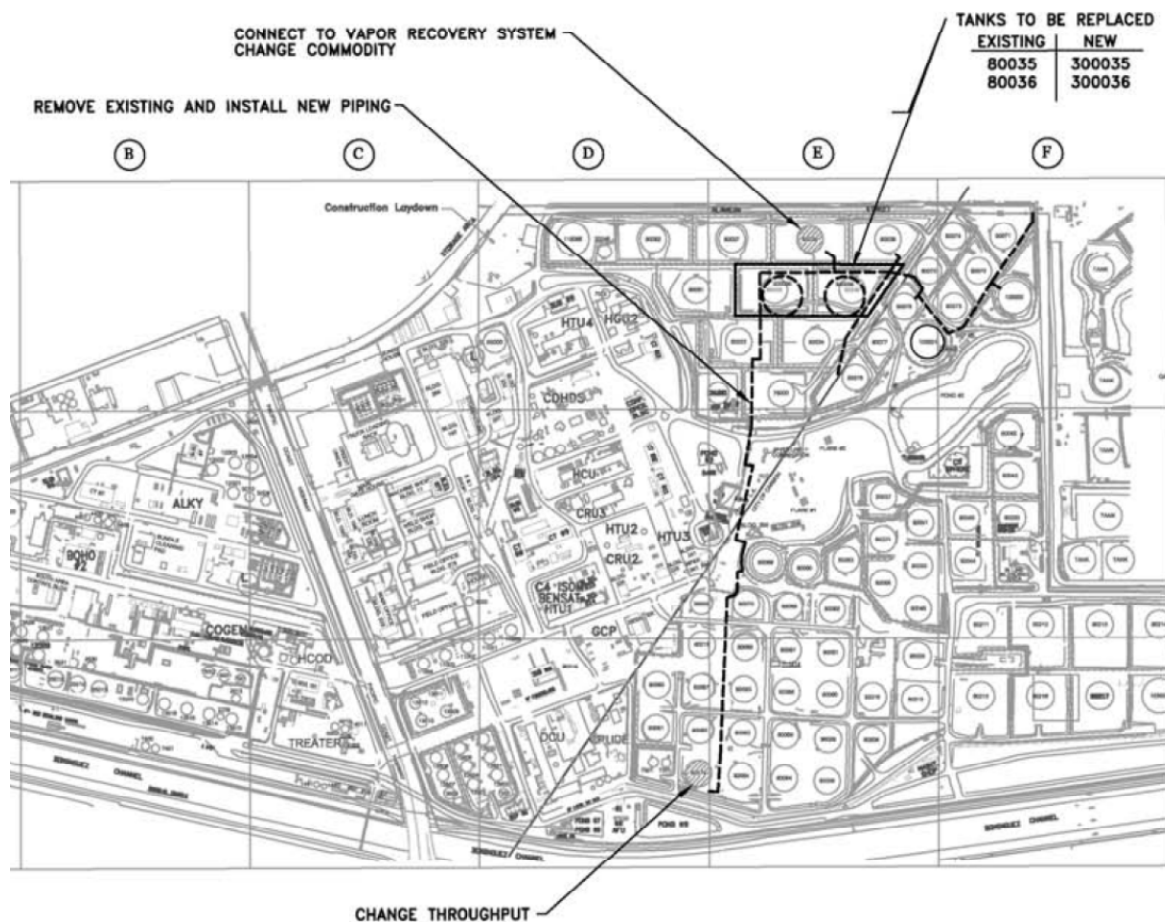
<sup>2</sup> A 12 inch diameter = 6 inch radius, a 42 inch diameter = 21 inch radius. Volume of material delivered depends on the pipe cross-section area. The cross-sections of the two pipes’ areas are: For 12 inch pipe the area =  $\pi r^2 = 3.14 \times (6 \times 6)$  sq inches, or 3.14 x 36; For 42 inch pipe the area =  $3.14 \times (21 \times 21)$  or 3.14 x 441. Thus the 42 inch pipe cross-section area is larger than the 12 inch pipe by a factor of 441/36, or 12.25.

The difference in the physical locations of the Marine Loading terminal and the refinery shown in the graphic above and the satellite images below illustrates that there will be a large increase in petroleum materials piped in the range of a mile from the terminal to the refinery. This in itself increases the risk of spills, especially during earthquakes. The ND states that there will not be a physical change at the Marine Terminal itself, but it fails to evaluate the major increase in volume of materials that will be present in the pipes at any one moment.

The Pier B Tesoro facility (Port of Long Beach, 820 Carrack Ave, Long Beach 90813, Facility ID 172878, Tesoro Logistics Operations LLC) was identified by the SCAQMD by telephone as the marine loading facility involved in the Project, although Tesoro Logistics now owns three marine loading facilities in Los Angeles. Different magnifications are inserted below, including Pier B, and the Wilmington refinery (on the order of a mile away):



The map below, excerpted from the ND (at p. 1-6), depicts the long path of the new pipeline across the refinery to the new refinery tanks. (This map has been rotated 90 degrees to make wording readable.) It also shows that the pipe goes *beyond* the new tanks, to the corner of the Wilmington property.



**B. Tesoro has published plans to increase throughput, yields, transport alternative crude types by rail to Washington then by ship to Long Beach, and to integrate the Wilmington refinery with the adjacent Carson refinery**

Both industry literature and Tesoro statements reveal that Tesoro has been planning the following:

- Increased throughput at its California refineries (including its Wilmington and Carson complex),
- Increased product yield,
- Integration of the Wilmington and Carson refineries,
- Changes in crude oil type delivery and processed in favor of cheaper crudes (“advantaged” or “discount” crudes which can have negative impacts when transported and refined),

- Use of rail to transport crude to Tesoro’s Vancouver Washington shipyard, and then by ship to California refineries (from Bakken oil fields in North Dakota but also potentially from Canadian tar sands fields),
- Use of its facilities by Third parties and for export, and
- Increased coking operations.

The alternative crude would be offloaded from marine vessels, sent through the greatly expanded pipeline described in the ND, and stored in the massively expanded storage tanks proposed. Importantly, the Wilmington and Carson refinery operations share a fence line.

These publicly acknowledged projects are clearly related to the storage tank expansion, and demonstrate that the proposed Project goes far beyond simple ship offloading efficiency. Even if we had no knowledge of these plans, such storage expansion would have the *potential* to allow expanded activities at the refinery and the Marine Loading dock, and to change operations through integration with Tesoro’s Carson refinery. These operations cannot be “piecemealed” from the storage project, and must be evaluated together through a full EIR.

### 1. Industry literature identified these plans

An example of an industry literature report on Tesoro plans is provided by Morningstar Inc. (a multinational, multi-billion dollar research and investment management firm<sup>3</sup>), which published the following analysis in July of 2013:<sup>4</sup>

*Tesoro aims to **increase throughput** of domestic crude over the next few years*

*Tesoro has embarked on a multiyear plan to improve its profitability, including increasing spending to support larger income improvement projects. The most significant of those, including capacity expansions and rail facilities, aim to take advantage of domestic crude discounts. . . .*

*We think, however, the biggest area of opportunity for Tesoro to improve its profitability is by increasing processing of discount crude, particularly in its primary market of California, where operating conditions remain challenging. The company is highly leveraged to developments within the state and that will only increase with its proposed acquisition of BP's BP Carson refinery. Operating in California can be advantageous because West Coast margins typically fetch a premium given the state's relative isolation from outside sources of refined product and specialized gasoline blends. . . .*

*The increased availability of discount crude bolsters the potential for the Carson acquisition despite the increased exposure to California. Specifically, Tesoro can dramatically improve the performance of Carson by optimizing its crude slate with light crude from the Bakken. Also, on its face the deal looks like a winner for Tesoro given the relatively attractive valuation of the refinery and the collection of associated*

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<sup>3</sup> <http://corporate.morningstar.com/US/asp/subject.aspx?xmlfile=177.xml>

<sup>4</sup> 7/24/2013 <http://analysisreport.morningstar.com/stock/archive?t=TSO&region=USA&culture=en-US&productcode=MLE&docId=604033> (emphasis added throughout quotes)

*midstream assets that can be dropped down to Tesoro Logistics TLLP. **Tesoro should gain further advantages from integrating Carson with the Wilmington refinery.** . . .*

***The addition of Carson and its integration with Tesoro's Wilmington refinery should lower costs and better position the company to deal with increasing environmental regulation.** . . . [Emphasis added throughout and below]*

Discount crudes generally have negative impacts as described below. For example, Canadian tar sands crude oil is very heavy, with high sulfur, requiring more intensive refining, and Bakken crude oil from the Dakotas has high paraffinic content (wax) and is explosive. These require specialized handling or more intensive refining with environmental and safety impacts (described later). The article also identifies the potential for Tesoro to import either Bakken or Canadian heavy tar sands crude.

***Increasing throughput of light and heavy discount crude from the Mid-Continent and Canada via rail will likely benefit Tesoro more, though.** To this end, Tesoro recently entered an agreement to develop a 120 mb/d crude by rail and marine facility in Washington. **The facility should be operational in 2014 and affords Tesoro the flexibility to send light or heavy crude to its California refineries.** Tesoro's California refineries should realize higher margins and improved returns through lower feedstock costs and **improved yields** while expending little capital.*

(Note that this project was updated and expanded from the 120,000 barrel/day figure to 360,000 barrel/day, to be completed in 2015.<sup>5</sup>) The Morningstar webpage also explained in July of 2013 why oil companies are incentivized to change operations to accommodate such cheap crude oil:

***Success in the refining business is primarily a function of the difference in the amount the refiner pays for oil and the amount at which it sells the refined product.** As such, the short- and long-term risks are dependent on movements in the prices of crude oil and gasoline or diesel. Supply interruptions or increased demand that drive up oil prices, as well as demand destruction or economic slowdown that depress gas prices, are the primary risks. **Additionally, the recent strong operating performance is attributable to wide crude differentials.***

Such crude differentials are available for both Bakken and Canadian tar sands crude. The costs can fluctuate, so many refiners, including Tesoro, are looking at both these sources depending on the most current price fluctuations and logistics. Tesoro has evaluated both Bakken and Canadian crude sources, and both these sources are booming compared to existing Tesoro crude sources, which have been dropping.<sup>6</sup>

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<sup>5</sup> Tesoro Savage, Application for Site Certification Agreement (Vancouver Application), Vol. 1, August 29, 2013, <http://www.efsec.wa.gov/Tesoro%20Savage/Application/EFSEC%202013-01%20Volume%20I/EFSEC%202013-01%20-%20Compiled%20PDF%20Volume%20I.pdf>

<sup>6</sup> California's Oil Refiners Double Crude-by-Rail Volumes (1), Lynn Doan May 02, 2014, Bloomberg Business Week, ["U.S. West Coast refiners including Tesoro Corp. (TSO:US) and Valero Energy Corp. (VLO:US) are developing projects to bring in more oil by rail from reserves across the middle of the U.S. and Canada to displace more expensive supplies. Crude production in PADD 5, which includes California and Alaska, has dropped every year since 2002 while drillers are extracting record volumes from shale in states including North Dakota and



The Morningstar report also identifies other refinery processes such as vacuum distillation, increased coking, increased product export, and increased yields, as related to the Project. For instance, the analysis identifies a recent Wilmington refinery vacuum distillation unit project allowing increased coking. The vacuum distillation tower was also reported in Bloomberg news in late 2012, with further allusions to Tesoro's plans to integrate Wilmington and Carson operations, which could result in shutdown of Tesoro's fluid catalytic cracking unit (FCC), unit. This further stresses the changes to overall refinery balancing and design which can occur as a result of the changes in crude oil which would be brought in as a result of the ND's pipeline and storage Project.<sup>7</sup>

Heavy, bottom of the barrel portions of crude oil are a much higher proportion in heavier crudes, which result in production of petroleum coke in higher quantities, which the storage project would also enable. The evaluation states:

*. . . To address these challenges, Tesoro is focusing on improving yields and lowering operating costs at its facilities while increasing export volumes to higher value markets. To improve yields, Tesoro replaced a vacuum distillation unit at its Wilmington facility, which should allow it to upgrade petroleum coke to clean products. . . .*

*In the Pacific Northwest, Tesoro's two refineries, which account for almost 30% of total capacity, are at a disadvantage because of their lack of cokers, resulting in poor yields and large amounts of fuel oil. However, Tesoro's recently completed project to rail upward of 50,000 bpd of discount, light Bakken crude to its Washington refinery, should lead to reduced dependence on waterborne crude and improved margins.*

Increased coking means increased emissions from coking operations. Increased exports have the potential to increase emissions due to refining, storing, and loading products for export. Increased yields of individual product units within the refinery have different characteristics, and must be evaluated specifically, rather than looking at the overall crude oil throughput, since different units have different chemical use and different emissions, which can be impacted even without an increase of crude throughput. All of these are related operations with potentially major impacts not evaluated in the ND.

The Morningstar literature identified the lack of cokers at Tesoro's Pacific Northwest refineries as increasing the need for taking advantage of available coking facilities in California refineries:

*Tesoro's refining capacity is concentrated in California. . . .*

*Second, it has invested in rail facilities to move 50 mb/d of Bakken crude west to its Anacortes, Wash., refinery, which has resulted in improved yield and margins. Finally, we expect the imbalance between light and heavy crude in the Mid-Continent will create an opportunity and*

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Texas." ] <http://www.businessweek.com/news/2014-05-02/california-doubles-oil-by-rail-volumes-as-canadian-imports-grow> and

Tesoro Seeks More Canadian Crude Oil for Its West Coast Refineries, February 7, 2013, Wall Street Journal, <http://online.wsj.com/article/BT-CO-20130207-710688.html>

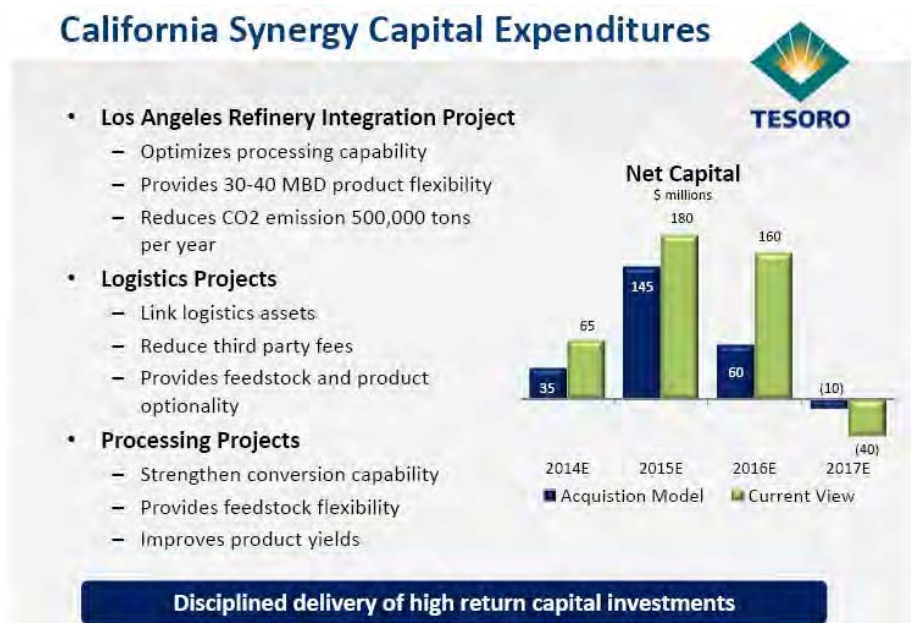
<sup>7</sup> Tesoro Wilmington Refinery Begins Operating New Vacuum Tower, Aaron Clark and Dan Murtaugh - Nov 26, 2012, <http://www.bloomberg.com/news/print/2012-11-26/tesoro-wilmington-refinery-begins-operating-new-vacuum-tower.html>

*economic incentive to rail both types of crude to its three California refineries, increasing their throughput of cost-advantaged crude. In fact, Tesoro already has plans in place to do so. . . .*

**2. Tesoro also published these plans**

Tesoro has confirmed these industry findings. For example, a February 2014 Tesoro slideshow<sup>8</sup> on Tesoro’s “Presentations” webpage states “*Los Angeles acquisition [BP Carson and terminals and coking] transforms our capabilities,*” providing flexibility in yield, access to “advantaged” crude oil, integrated logistics infrastructure, etc. (Slide 7).

Another slide below (12) identifies the “Los Angeles Refinery Integration Project” (integrating Carson and Wilmington refineries) as optimizing processing capability and “product flexibility”:

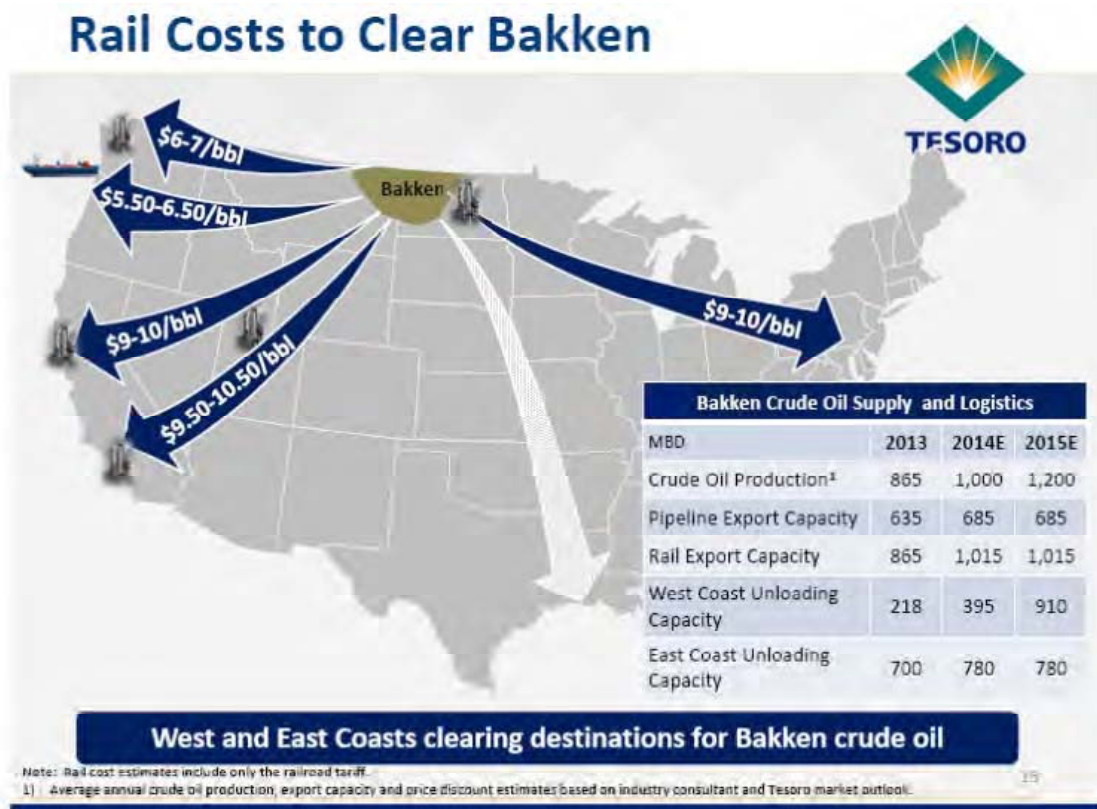


This is followed by a slide describing Tesoro’s “Advantaged” feedstock opportunity, “*Extending the advantaged crude oil to the West Coast,*” and changing the Los Angeles operations crude oil feedstock from 15% California Heavy crude to “*Potentially up to 50% California Heavy and Bakken*” crude oil (at Slide 13).

The slideshow also evaluates the cost of crude by rail directly to West Coast refineries, including Los Angeles, in the following (slide 15), but also states that the cost of rail to the state of Washington, and then by ship to California, is “Competitive with direct rail cost to California” (at Slide 17). Slide 17 also finds that its Washington rail to ship project provides “*Flexibility to deliver to all West Coast refineries.*”

<sup>8</sup> Simmons Energy Conference, *Transformation through Distinctive Performance*, February 27, 2014, <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> attached

Another key point on Slide 15 as shown below is the massive increase in “West Coast Unloading capacity” from 218 barrels per day (bpd) in 2013, to 395 bpd estimated in 2014, to 910 bpd estimated in 2015. California is the largest share of West Coast Tesoro capacity, and Los Angeles is the largest share of Tesoro California capacity.



Crude oil unloading capacity is the subject of this ND, by unloading crude oil from ship to the expanded pipeline, to the expanded storage tankage. **As a result, it is clear that Tesoro’s West Coast plans for bringing Bakken crude into LA will require the increased unloading and storage identified in the Negative Declaration.**

Another very similar version of this slideshow presented a month earlier by Tesoro (January 2014)<sup>9</sup> elucidates further that “Terminaling, Transportation, and Storage” will “Consolidate Tesoro volumes in Southern California distribution system” (and identifies additional impacts in Southern California). Storage capacity is an essential requirement for terminal, transportation, and refining operations. None of the required evaluation of relationships of storage capacity changes to these other processes have been evaluated in the negative declaration, as they should have been.

<sup>9</sup> 2014 Deutsche Bank Energy Conference, January 9, 2014, <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> (Slide 24), attached



Slide 34 in this second presentation also mentions a plan to decommission the Wilmington refinery’s FCC (Fluid Catalytic Cracker) unit. Again, such a change should be identified as part of the whole broad project, either directly, or as part of a cumulative impacts evaluation.

The Slides and previous reports above show that Tesoro has considered different options for transporting crude from North Dakota and Canada to the Los Angeles complex, including rail transport directly to California (despite the ND’s dismissal of rail as potentially connected to this Project). Tesoro has lately settled on the rail to Washington and ship to Long Beach option. However, if conditions change (for example, if the Washington hub does not proceed due to public opposition), Tesoro could instead take advantage of the new Tankage’s proximity to the nearby railline that traverses both its LA refineries. For example, the new Tesoro pipeline continues past the new storage tanks, and ends next to the railway that transects the refinery, as discussed later.

**III. Potential impacts of the Project are large**

**A. Changes in crude oil feedstock facilitated by the Project have significant impacts**

- 1. Waxy Bakken crude oil requires special handling and creates problems of transfer in both marine vessels and refinery storage tanks and requires chemical dispersants**

An article from Hydrocarbon Processing -- *Innovative Solutions for Processing Shale Oils*<sup>10</sup> -- identifies problems in processing oils such as Bakken shale, due to high variability in crude qualities, waxy buildup (paraffinic content), etc. This article specifically identified transfer to refinery tankage as problematic:

***The paraffin content of the shale oils is impacting all transportation systems. Wax deposits have been found to coat the walls of railroad tank cars, barges and trucks. Waxy deposits in pipelines regularly require pigging to maintain full throughput. Bakken shale oil is typically transported in railcar, although pipeline expansion projects are in progress to accommodate the long-term need. These railcars require regular steaming and cleaning for reuse. Similar deposits are being encountered in trucks being used for shale oil transportation. The wax deposits also create problems in transferring the shale oils to refinery tankage. Fig. 4 shows samples of deposited wax collected from pigged pipelines<sup>11</sup> in shale oil service. [emphasis added]***

The article provided photos (entitled “waxy deposits removed from shale oil buildup”) which graphically depict the more obvious problems with Bakken crude:



The article also identified multiple chemical dispersants used to mitigate these problems not only during transportation, but also within refineries where these shale oils are processed.

*To control deposition and plugging in formations due to paraffins, the dispersants are commonly used. In upstream applications, these paraffin dispersants are applied as part of multifunctional additive packages where asphaltene stability and corrosion control are also addressed simultaneously.*

These chemicals must be identified in a full EIR in order to assess the impacts of their use. The article also found that steam cleaning is used to remove such deposits from railcars. Such activities should be identified and associated impacts evaluated. Impacts within the refinery must also be evaluated for safety risks.

## **2. Bakken crude oil also causes fouling of preheaters, heat exchangers, and furnaces, refinery corrosion, and can shutdown refinery units**

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<sup>10</sup> Innovative Solutions for Processing Shale Oils, Hydrocarbon Processing, 7/10/2013, attached <http://www.hydrocarbonprocessing.com/Article/3223989/Innovative-solutions-for-processing-shale-oils.html>

<sup>11</sup> A “pig” is launched through a pipeline until it reaches a receiver

The Hydrocarbon Processing article found that asphaltene destabilization can occur when blending shale oil with heavier crudes. This is precisely the kind of blending that could occur due to the Project, since Tesoro has stated it plans to change the crude slate in California from 15% California Heavy crude to “Potentially up to 50% California Heavy and Bakken” (see earlier in this comment).

These problems result in fouling of the cold preheat train, fouling of hot preheat exchangers and furnaces, problems in transportation, storage, refinery corrosion, and crude unit shutdowns. These oils are also extracted through fracturing, which have additional and major impacts on water, air, and the global climate. The article finds:

*The refining of shale oil (also known as tight oil) extracted through fracturing from fields such as Eagle Ford, Utica and **Bakken** has become prevalent in many areas of the US. Although these oils are appealing as refinery feedstocks due to their availability and low cost, processing can be more difficult.*

***The quality of the shale oils is highly variable. These oils can be high in solids with high melting point waxes.** The light paraffinic nature of shale oils can lead to asphaltene destabilization when blended with heavier crudes. These compositional factors have resulted in cold preheat train fouling, desalter upsets, and fouling of hot preheat exchangers and furnaces. Problems in transportation and storage, finished-product quality, as well as refinery corrosion, have also been reported. Operational issues have led to cases of reduced throughput and crude unit shutdowns. The problems encountered with shale oil processing and possible prediction and control strategies will be presented.*

[Emphasis added throughout and below]

The article found use of shale oils was particularly problematic when blended with heavy crudes, which is admittedly planned by Tesoro for its California refinery operations. This blending can cause agglomeration of large molecules onto surfaces inside refinery units which can crack and leave coke-like deposits if the surfaces are hot.<sup>12</sup> Coke deposits lead to poor operation and can cause shut down of units before planned maintenance periods. All these problems require special handling and planning at the refinery. In addition, the article found shale oils to be highly variable in certain characteristics including for example, its solids content, and others. The article states:

*Due to their paraffinic nature, mixing shale oil with asphaltenic oil leads to destabilization of the asphaltene cores. Asphaltenes are polar compounds that influence emulsion stability. Once the asphaltenes destabilize, they can agglomerate, leading to larger macro-molecules. On hot surfaces, agglomerated asphaltenes easily crack or dehydrogenate and gradually form coke-like deposits.*

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<sup>12</sup> Coke is a petroleum product that is mostly the carbon leftover after making gasoline from crude oil. Coke is a fuel, and similar to coal, as an energy source that results in high GHG and criteria pollutant emissions, and significant heavy metal content.

3. **Bakken crude is volatile and explosive and these characteristics were not evaluated in the ND**

Unfortunately, Bakken crude oil has been fatally demonstrated as very volatile and explosive, as in the case of the tragic explosions at Lac Megantic in Canada, and in other instances.

The U.S. Department of Transportation Pipeline and Hazardous Material Safety Administration issued a safety alert regarding the transport of this type of crude oil in January of 2014, finding that **whether it was transported in railcar or other mode of transport, it represents unique hazards of explosion, fire, and corrosivity**, requiring additional testing, handling, and public information for first responders.<sup>13</sup> Entrained gases require additional testing.

*The Pipeline and Hazardous Materials Safety Administration (PHMSA) is issuing this safety alert to notify the general public, emergency responders and shippers and carriers that recent derailments and resulting fires indicate that the type of crude oil being transported from the Bakken region may be more flammable than traditional heavy crude oil.*

*Based upon preliminary inspections conducted after recent rail derailments in North Dakota, Alabama and Lac-Megantic, Quebec involving Bakken crude oil, PHMSA is reinforcing the requirement to properly test, characterize, classify, and where appropriate sufficiently degasify hazardous materials prior to and during transportation. Proper characterization will identify properties that could affect the integrity of the packaging or present additional hazards, such as corrosivity, sulfur content, and dissolved gas content. These characteristics may also affect classification.*

*PHMSA stresses to offerors the importance of appropriate classification and packing group (PG) assignment of crude oil shipments, whether the shipment is in a cargo tank, rail tank car or other mode of transportation. Emergency responders should remember that light sweet crude oil, such as that coming from the Bakken region, is typically assigned a packing group I or II. The PGs mean that the material's flashpoint is below 73 degrees Fahrenheit and, for packing group I materials, the boiling point is below 95 degrees Fahrenheit. **This means the materials pose significant fire risk if released from the package in an accident.***

*. . . Based on initial field observations, PHMSA expanded the scope of lab testing to include other factors that affect proper characterization and classification such as **Reid Vapor Pressure, corrosivity, hydrogen sulfide content and composition/concentration of the entrained gases in the material.** The results of this expanded testing will further inform shippers and carriers about how to ensure that the materials are known and are properly described, classified, and characterized when being shipped. In addition, understanding any unique hazards of the materials will enable offerors, carriers, first responders, as well as PHMSA and FRA to identify any appropriate mitigating measures that need to be taken to ensure the continued safe transportation of these materials.*

This is a major problem with the Project, at the Marine Terminal in Long Beach, in the expanded pipeline to the refinery, in the storage tanks at the refinery, and in the refinery where it will be

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<sup>13</sup> The U.S. Department of Transportation Pipeline and Hazardous Material Safety Administration, January 2, 2014, [http://phmsa.dot.gov/pv\\_obj\\_cache/pv\\_obj\\_id\\_111F295A99DD05D9B698AE8968F7C1742DC70000/filename/1\\_2\\_14%20Rail\\_Safety\\_Alert.pdf](http://phmsa.dot.gov/pv_obj_cache/pv_obj_id_111F295A99DD05D9B698AE8968F7C1742DC70000/filename/1_2_14%20Rail_Safety_Alert.pdf) , attached

used. It was a major failure of the ND to ignore these impacts, which even without the other impacts, would require an EIR.

**4. Bakken crude refining can also increase levels of acutely hazardous and corrosive Hydrogen Sulfide in the refinery**

The Hydrocarbon Processing article also identified increased levels of extremely hazardous hydrogen sulfide (H<sub>2</sub>S) gas as a problem associated with shale oil. Furthermore, when scavenging agents are used to reduce H<sub>2</sub>S presence, these can cause corrosion and form solid deposits inside processing units. The article states:

*Several shale oil production locations have high H<sub>2</sub>S loading. To ensure worker safety, scavengers are often used to reduce H<sub>2</sub>S concentrations. The scavengers are often amine-based products—methyl triazine, for instance—that are converted into mono-ethanolamine (MEA) in the crude distillation unit (CDU). Unfortunately, these amines contribute to corrosion problems in the CDU. Once MEA forms, it rapidly reacts with chlorine to form chloride salts. These salts lose solubility in the hydrocarbon phase and become solids at the processing temperatures of the atmospheric CD towers and form deposits on the trays or overhead system. **The deposits are hygroscopic, and, once water is absorbed, the deposits become very corrosive.** These physical properties are responsible for the problems that are being experienced by refineries handling shale oils.*

Hydrogen sulfide is deadly, corrosive, causes odor complaints when released, and its increase in the refinery certainly requires specific evaluation that was absent in the ND.

A report by BakkenShale.com found:<sup>14</sup>

*Is the Bakken producing higher volumes of H<sub>2</sub>S? That's the question you have to ask yourself when you see pipelines implementing H<sub>2</sub>S standards for the first time.*

*On May 8, Enbridge submitted an emergency application to the Federal Energy Regulation Commission (FERC) asking to amend its conditions of carriage to 5 ppm of H<sub>2</sub>S or less. If accepted, Enbridge would have the right to reject crude with higher levels of H<sub>2</sub>S. . . .*

***Enbridge acted after it found concentrations of 1,200 ppm in a crude tank at its Berthold Terminal. 20 ppm is the limit allowed by OSHA and an average of 10 ppm of exposure is all that is allowed over an 8-hour work day.***

*Both Plains Marketing and Murex Petroleum objected to the FERC application, but it looks as if they solved their differences when Enbridge notified FERC it wasn't planning an outright ban on crude with higher H<sub>2</sub>S concentrations. The two companies weren't against the change, but were afraid they couldn't comply in the time frame planned.*

Thus hazardous and corrosive sulfur compounds can either be part of the crude characteristic, but also can be transported with otherwise low sulfur crude oil. The Chemical Safety Board report also identified that H<sub>2</sub>S was a particularly aggressive corrosive agent.<sup>15</sup> These issues must be

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<sup>14</sup> May 30, 2013, <http://bakkenShale.com/pipeline-midstream-news/bakken-producing-sour-gas-h2s-problem-in-north-dakota/>

<sup>15</sup> *Id.* at p. 33



evaluated through a full EIR to prevent severe safety risks associated with crude slate changes.

The problem of sulfur corrosion increasing accident risk was unfortunately born out at Chevron Richmond in California last August, when a major explosion barely avoided killing 19 workers, but did send 15,000 neighbors to the hospital, after a huge black plume traveling many miles through the Bay Area resulted from the crude unit explosion, which burned for many hours.

Steelworkers testified at the U.S. Chemical Safety Board hearing on the Chevron explosion that such sulfur corrosion is a statewide problem at California oil refineries.<sup>16</sup> The Chemical Safety Board found the Richmond accident was caused by sulfur corrosion that Chevron had been aware of, and had repeatedly ignored, and the report showed that sulfur content had increased. The photos below show the heavy impact not only in Richmond, but across the San Francisco Bay Area due to this accident.

A discussion of corrosion issues at oil refineries due to increased sulfur content in crude oil, and other important related issues was provided in the attached report of Greg Karras on the Phillips 66 *Rodeo* refinery EIR.<sup>17</sup> Also refer to the previously cited report of Dr. Fox on impacts of use of “advantaged” crude are also in process.

These reports demonstrate in further detail the impacts of corrosion demonstrated by the US Chemical Safety Board, causing the massive explosion in August of 2012 in the Chevron Richmond refinery, pictured below. The U.S. Chemical Safety Board report is also available.<sup>18</sup> The significance of the air pollution impacts caused by the Chevron explosion are self-explanatory, in the photos below of the August 2012 explosion caused by the refinery corrosion.



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<sup>16</sup> U.S. Chemical Safety Board transcript of public hearing on Chevron Richmond, CA August 2012 explosion and fire, page 225, <http://www.csb.gov/assets/1/19/0503CSB-Meeting.pdf>

<sup>17</sup> Expert Report of Greg Karras, CBE, 4 September 2013, Regarding the Phillips 66 Company Propane Recovery Project Draft Environmental Impact Report released in June 2013 by the Contra Costa County Department of Conservation and Development

<sup>18</sup> Interim Investigation Report, Chevron Richmond Refinery Fire, (which as adopted at the July public hearing) available at: [http://www.csb.gov/assets/1/19/Chevron\\_Interim\\_Report\\_Final\\_2013-04-17.pdf](http://www.csb.gov/assets/1/19/Chevron_Interim_Report_Final_2013-04-17.pdf)



**5. Another “advantaged” crude oil from Canadian Tar Sands that Tesoro plans to import also causes major impacts**

As previously identified, Tesoro plans to bring cost advantaged crude oil to Los Angeles, both light and heavy, including heavy Canadian tar sands crude. Canadian tar sands crude is even cheaper than Bakken, as discussed by Bloomberg about Tesoro’s plans to use the cost advantage of Canadian heavy crude in California.

*U.S. West Coast refiners including Tesoro Corp. (TSO) and Valero Energy Corp. (VLO) are developing projects to bring in more oil by rail from reserves across the middle of the U.S. and Canada to displace more expensive supplies. Crude production in PADD 5, which includes California and Alaska, has dropped every year since 2002 while drillers are extracting record volumes from shale in states including North Dakota and Texas.*

*The surging flows of domestic oil to California “reflect a continuing improvement in crude-by-rail receiving facilities here,” David Hackett, president of Stillwater Associates, an energy consultant, said by phone from Irvine, California.*

**Lower Costs**

*Crude from North Dakota and Canada trades at a discount to Alaska North Slope oil, which rose 36 cents to \$107.78 a barrel at 9:09 a.m., data compiled by Bloomberg show. **Western Canada Select, a heavy, sour blend, gained 36 cents to \$82.88.** North Dakota’s Bakken crude also gained 36 cents to \$95.28. It costs \$9 to \$10.50 a barrel to send North Dakota’s Bakken oil by rail to California, according to Tesoro, the West Coast’s largest refiner.*

Of course, tar sands crude oil causes major environmental damage during its mining in Canada, as described by the World Resources Institute, which rather mildly states the severe impacts:<sup>19</sup> “The local and regional environmental impacts of heavy oil and tar sands production can include: significant water consumption, massive earth moving and ecosystem disturbance, increased criteria and other air pollution, and release of heavy metals and toxic materials.”

But the ND must account for the local Los Angeles region, and global impacts. Canadian tar sands are even heavier than most heavy conventional crudes (higher carbon content, requiring additional energy to process and increasing emissions) and have higher sulfur content. Contaminants must be removed during refining, which increases hazardous materials present within the refinery and can lead to dangerous corrosion within refinery operations units. These

<sup>19</sup> <http://www.wri.org/publication/content/10339>

also increase energy needed for refining, resulting in higher greenhouse gas and smog-precursor emissions. The corrosion hazard is increased due to the higher sulfur content, increasing refinery accident risk identified by the US Chemical Safety Board in the last section.

The ND failed to evaluate the obvious increases in desulfurization processes within the refinery due to higher sulfur content, as well as additional cracking, coking, and additional use of hydrogen, all of which require more energy and increase criteria and toxic pollutant emissions. This is a major and obvious area of impacts that was completely ignored in the ND, especially without any baselines provided.

An Oil & Gas Journal article *Special Report: Refiners processing heavy crudes can experience crude distillation problems* (Oil and Gas Journal),<sup>20</sup> also identified the need for additional desalting and temperature controls in order to process unconventional crude oils. This and the other articles identified many problems with processing unconventional crudes, emphasizing that it is not just *volume* of crude throughput that determines environmental impacts, but also the characteristics or *quality* of the crude oils. The Oil and Gas Journal article (*Refiners processing heavy crudes can experience crude distillation problems*) also identified a number of differences in the content of unconventional crudes (such as tar sands and others):

*Heavy crudes have much higher microcarbon residue (MCR), asphaltenes, and metals. As mandated refinery gasoline and diesel pool sulfur specifications take effect, minimizing cat feed hydrotreater (CFHT) feed contaminants becomes more important. In some cases, vanadium in the CFHT feed has increased from less than 1 ppm to 5-10 ppm with heavy Venezuelan crudes.<sup>1</sup> **High feed-stream contaminants can reduce run length to less than half the planned turnaround interval.** Optimizing the atmospheric column flash-zone and wash section, and the vacuum unit design can reduce CFHT feed vanadium by 30-40%. . . .*

*Heavy crudes have higher viscosities, some have higher salt content, several have high naphthenic acid content, and they are all more difficult to distill than lighter crude blends. Some upgrader crudes also have lower thermal stability than conventional crudes and higher fouling tendencies due to the increased likelihood of asphaltene precipitation. . . .*

*High chlorides to the atmospheric heater generate large quantities of hydrochloric acid (HCl). Severe fouling in the crude column's top, rapid fouling and corrosion in the atmospheric condenser system, and severe overhead line corrosion often reduce crude runs and unit reliability.*

A complete inventory and evaluation of differences in the crude oils to be processed at the refinery due to the Project changes needs to be evaluated for environmental impacts.

Additional emissions during the transport, piping, tank loading, and in refinery operation from volatile diluents used with expanded tar sands crude oils have not been identified, and should be, with emissions quantified. Diluents can include volatile and toxic compounds such as BTEX

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<sup>20</sup> Oil and Gas Journal, Special Report: Refiners processing heavy crudes can experience crude distillation problems, 11/18/2002, available at <http://www.ogi.com/articles/print/volume-100/issue-47/special-report/special-report-refiners-processing-heavy-crudes-can-experience-crude-distillation-problems.html> , attached

VOCs (Benzene, Toluene, Ethylbenzene, and Xylene).<sup>21</sup> In addition to the highly reactive ozone-precursor quality of such diluents, they need to be identified and evaluated as toxic air contaminants, due to carcinogenicity and other health impacts, as well as any potentially explosive compounds.

**6. The Project Description failed to provide baseline data on the current crude oil slate, to compare it to the “advantaged” crudes the Project allows, and to identify the potentially significant impacts of such changes**

The ND did not provide baseline information about the crude oil slate. This is a major omission especially given Tesoro’s public acknowledgement of the key nature of its planned switch to cost-advantaged crude oils such as Bakken crude (or Canadian tar sands). The ND assumes that if general *types* of crude oil and products remain the same, then the Project cannot cause changes with significant impacts. But this is demonstrably false – changes in the crude slate can cause major impacts regardless of existing AQMD permit conditions, even if volumes don’t change. Tesoro should have provided this baseline information.

Through outside sources we can find some very basic information about the recent crude slate at Tesoro’s Wilmington and Carson refineries:

- The Alaska Business Monthly stated that the Carson refinery formerly owned by BP has recently (2012) processed significant levels of Alaska North Slope crude (ANS).<sup>22</sup>

*“According to Chuck Coulson, BP’s manager for midstream operations, BP refines “virtually” all of its Alaska crude at its two West Coast refineries: Cherry Point in Puget Sound and Carson refinery in L.A. County. BP runs a mix of Alaska North Slope crude and crude from other countries at both facilities.*

- The BP website stated in 2013 that the Carson facility processed **ANS, Middle Eastern, and West African crude**.<sup>23</sup>

*“It processes crude oil from Alaska’s North Slope, the Middle East and West Africa.”*

- Tesoro’s SEC report identified in California refineries:<sup>24</sup>  
*“Our California refineries run a significant amount of **South American heavy crude oil (“Oriente”), San Joaquin Valley Heavy (“SVH”) and light crude oil from Iraq (“Basrah”),** which continued to be priced at a discount to Brent throughout 2013.”*

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<sup>21</sup> Comments of NRDC on the Notice of Intent to Adopt a Mitigated Negative Declaration for the Valero Crude by Rail Project, July 1, 2013, on impacts of diluents and other important impacts related to the Valero Benicia crude by rail project in common with the Phillips 66 Los Angeles refinery complex, <http://switchboard.nrdc.org/blogs/dbailey/NRDC%20comments%20letter%20on%20Notice%20of%20Intent%20to%20Adopt%20a%20Mitigated%20Negative%20Declaration%20for%20the%20Valero%20Crude%20by%20Rail%20Project.pdf>

<sup>22</sup> Following North Slope Crude from the Ground to the Gas Station, May 2012 article, <http://www.akbizmag.com/Alaska-Business-Monthly/May-2012/Following-North-Slope-Crude-From-the-ground-to-the-gas-station/?utm>

<sup>23</sup> BP Completes Sale of Carson Refinery and Southwest U.S. Retail Assets to Tesoro Release date: 03 June 2013, <http://www.bp.com/en/global/corporate/press/press-releases/bp-completes-sale-of-carson-refinery-and-southwest-u-s--retail-a.html>

<sup>24</sup> <http://biz.yahoo.com/e/140224/tso10-k.html>

Tesoro’s 2013 SEC report<sup>25</sup> also provides a general picture of Tesoro’s crude slate in California from 2011 to 2013 (but not at the individual refineries):

*Our refineries process both heavy and light crude oil. Light crude oil, when refined, produces a greater proportion of higher value transportation fuels such as gasoline, diesel and jet fuel, and as a result is typically more expensive than heavy crude oil. In contrast, heavy crude oil produces more low value byproducts and heavy residual oils. These lower value products can be upgraded to higher value products through additional, more complex and expensive refining processes. Throughput volumes by feedstock type and region are summarized below (in Mbpd):*

	2013		2012		2011	
	Volume	%	Volume	%	Volume	%
California						
Heavy crude	178	42	151	62	156	65
Light crude	206	49	67	28	60	25
Other feedstocks	38	9	24	10	25	10
Total	422	100	242	100	241	100

Tesoro’s chart shows Heavy Crude feedstock lowering from 65 to 42%, with Light Crude increasing from 25 to 49%, and other unidentified feedstocks remaining about the same. It appears that at least half of 2013 did not include the BP purchase, which increased the throughput greatly.

The US EIA (Energy Information Administration) provides data on foreign crude imports, but not on refineries’ domestic crude use. The following table provides an example of US EIA Tesoro data for the month of March 2014. The ND should provide current baseline information from 2010 to the present, including both imported and domestic crude slate for each of the Wilmington and Carson refinery portions.

<sup>25</sup>Tesoro’s US Securities and Exchange Commission (SEC), Annual 10-K report, for 2013, at p. 5, [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDIQFjAC&url=http%3A%2F%2Fphx.corporate-ir.net%2FExternal.File%3Fitem%3DUGFyZW50SUQ9NTM1NDc5fENoaWxkSUQ9MjZNTc3fFR5cGU9MQ%3D%3D%26t%3D1&ei=UuGUU7CZO8qOqAbW7ILgAg&usg=AFQjCnFro71tQanqMTIBnERVK-mEduvJPQ&sig2=-yTQ5qcuA3RSmO-yIldOqQ&bvm=bv.68445247\\_d.b2k](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDIQFjAC&url=http%3A%2F%2Fphx.corporate-ir.net%2FExternal.File%3Fitem%3DUGFyZW50SUQ9NTM1NDc5fENoaWxkSUQ9MjZNTc3fFR5cGU9MQ%3D%3D%26t%3D1&ei=UuGUU7CZO8qOqAbW7ILgAg&usg=AFQjCnFro71tQanqMTIBnERVK-mEduvJPQ&sig2=-yTQ5qcuA3RSmO-yIldOqQ&bvm=bv.68445247_d.b2k)

<b>US EIA Data, Tesoro Corp Crude Oil Imports, Port City: Los Angeles, CA, Port Code 2704, Reporting Period March 2014.</b> Downloaded 6/8/2014 by Jmay, CBE, from US EIA Excel file at: <a href="http://www.eia.gov/petroleum/imports/companylevel/">http://www.eia.gov/petroleum/imports/companylevel/</a> . Totals and weighted averages are added				
<b>CNTRY_E2NAME</b>	<b>QUANTITY (thousands of bpd)</b>	<b>SULFUR</b>	<b>API GRAVITY</b>	<b>PCOMP_SNAM</b>
ANGOLA	230	0.4	25.6	CARSON
ANGOLA	321	0.45	25.6	CARSON
ANGOLA	342	0.42	25.6	CARSON
ANGOLA	502	0.45	25.7	CARSON
COLOMBIA	379	0.7	28.4	CARSON
IRAQ	150	2.59	32	CARSON
IRAQ	257	2	28.9	CARSON
IRAQ	294	2.58	32	CARSON
IRAQ	356	3.13	29.3	CARSON
IRAQ	693	3.08	29.3	CARSON
IRAQ	802	2.61	31.9	CARSON
TOTAL	4326			
CARSON	Weighted Average:	1.82	28.77	
CANADA	245	3.46	24.1	WILIMINGTON LOS ANGELES
ECUADOR	396	1.95	19.9	WILIMINGTON LOS ANGELES
TOTAL	4326			
WILMINGT	Weighted Average:	2.53	21.51	

The data above shows that out of crude imports, almost 38% of the Wilmington refinery in March was already from Canada, with a very high sulfur content – indicating that Wilmington is already importing substantial Canadian tar sands crude. However, the weighted average sulfur content for that month for *imports* of Tesoro was about 2.53% sulfur (for imports only, since the EIA data does not provide domestic crude use information by refinery), much lower than the Canadian crude (shown at 3.46%). Increasing the Canadian source further will increase the average sulfur content.

The Carson portion of the Los Angeles refinery complex on the other hand, had a much lower weighted sulfur average (1.82%), and lighter crude oil (API gravity is a reverse scale, so that higher gravity indicates lighter crude). The former BP Carson refinery is designed for a lighter feedstock compared to the Wilmington refinery. The location of the new storage tanks, with the proposed pipeline expansion through the refinery, and continuing to the corner of the Wilmington operation, could be used to source either the Wilmington OR the Carson operations.

Having a major increase in tankage and connection via rail to Washington and via ship to Long Beach, allows Tesoro to increase either lighter Bakken OR heavy Canadian tar sands, both “advantaged” crude oils, both with serious environmental impacts.

There is an array of public information available about the potential impacts at refineries using different crude oil slates. In one example, the International Council on Clean Transportation’s 2013 Report: *Effects of Possible Changes in Crude Oil Slate on the U.S. Refining Sector’s CO2 Emissions, Final Report*<sup>26</sup> found not only that refinery CO2 emissions varied considerably

<sup>26</sup> March 29, 2013, [http://www.theicct.org/sites/default/files/publications/ICCT\\_Refinery\\_GHG\\_Study\\_Proj\\_Report\\_Apr2013.pdf](http://www.theicct.org/sites/default/files/publications/ICCT_Refinery_GHG_Study_Proj_Report_Apr2013.pdf)

depending on the type of crude oil processed, but identified the changes in yields of refinery products. Further, an excerpt from this report shows that Bakken shale oil (generally considered on *average* a light and low sulfur crude oil), can vary in quality, and can be heavy,<sup>27</sup> so it should not be assumed that imported Bakken crude would always be lighter than the current slate.

Inputs & Outputs	2011	Crude Slate							
	Calib	Base	Ext. Heavy	Very Heavy	Heavy	Mid Expan	Import Indep	Light	Very Light
<b>Inputs (K b/d)</b>									
Crude Oil	14,712	14,314	14,383	14,664	14,540	14,327	14,354	14,131	14,057
C4s	234	170	246	170	170	170	170	170	170
NGL, Naphtha & Gas Blindstk.	209	302	302	302	302	302	302	302	302
Heavy Gas Oil & Resid	661	474	474	474	474	474	474	474	474
<b>Purchased Energy</b>									
Electricity (MM Kwh/d)	172	167	190	183	177	170	167	155	154
Natural Gas (K foeb/d)	612	642	783	715	703	665	664	631	636
<b>Outputs (K b/d)<sup>1</sup></b>	<b>15,682</b>	<b>15,105</b>	<b>15,113</b>	<b>15,108</b>	<b>15,101</b>	<b>15,094</b>	<b>15,089</b>	<b>15,082</b>	<b>15,082</b>
Light Gases	583	542	550	545	538	531	526	519	519
Aromatics, Naphthas, & Av Gas	259	241	241	241	241	241	241	241	241
Hydrocarbon Gasoline	7,623	6,764	6,764	6,764	6,764	6,764	6,764	6,764	6,764
Jet Fuel	1,493	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
Diesel Fuel	4,471	4,946	4,946	4,946	4,946	4,946	4,946	4,946	4,946
Resid & Asphalt	895	715	715	715	715	715	715	715	715
All Other Liquids	358	332	332	332	332	332	332	332	332
Coke	590	690	1,015	1,109	940	731	692	456	361
Sulfur (K s tons/d)	20	19	23	29	26	20	21	13	12

The specific CO2 emissions in this study have been refuted by a peer reviewed CBE study published in Environmental Science and Technology<sup>28</sup> which showed that the greenhouse gas emissions impacts of heavy crude oil are much higher than shown in this oil industry-sponsored study.

The CBE paper documented that the impacts of crude oil density or API gravity (heaviness of crude oil) and sulfur content (which usually accompanies heavy crude) on greenhouse gas emissions strongly predicts high energy use at oil refineries. High energy use means high carbon dioxide emissions from this processing. This high energy intensity drove a 39% increase in greenhouse gas emissions across regions and years at oil refineries.

However, even the industry study showed in the chart above that crude quality impacts the volume of individual products *produced* by the refinery. This is also a common-sense conclusion – it is obvious that lighter crude oils produce higher volumes of gasoline, and that heavier crude oils produce more bottoms and more coking. These changes cause a multitude of environmental impacts that the District is well aware of. But the ND assumes contrary to these fundamental principles, that because throughput is expected not to change, and heat input is expected to be the same at the crude unit at the front end, that no changes will occur downstream in the refinery. This is plainly incorrect and must be re-assessed (in addition to the problem of lack of baselines in the ND).

<sup>27</sup> In the Table entitled *Exhibit 3: Composition of Alternative Crude Slates, by Crude Type* (K b/d), showed 720 thousand barrels per day of Bakken crude oil in the Heavy Crude designation column, 37<sup>th</sup> page

If light, low sulfur Alaska North Slope (ANS) crude oil, which is continually lowering in production, is displaced with extremely heavy, high sulfur Canadian tar sands crude oil, clearly that would increase sulfur content in the refinery, increase corrosion hazard and potential impacts of H<sub>2</sub>S gas, and require additional energy to process the heavy crude.

If Bakken crude oil were to replace, for example, ANS at the Tesoro refineries, this may or may not be comparable to ANS crude *in gravity and sulfur content*. (since Bakken is acknowledged as extremely variable). However, even if the Bakken crude were light, its high paraffin content described above, can cause waxy, dangerous buildup in transport, in the refineries, can be accompanied by toxic diluents, and explosion hazards (a la Lac Megantic explosion in Canada).

If Bakken is mixed with heavy crudes, asphaltene destabilization, preheater fouling, desalter upsets, unwanted coking, etc., identified earlier in the Hydrocarbon Processing article, can occur. These impacts can cause dangerous shutdowns and accidents. The specific changes must be identified to provide an accurate Project Description, to enable a full evaluation of potential impacts.

If instead, which may be the most likely case, heavy Canadian Select would replace California heavy crude at the Wilmington facility, then sulfur content and API gravity goes up considerably, causing increased presence of H<sub>2</sub>S and increased energy use; while the Bakken imports would go to the Carson portion of the refinery complete, which is designed to handle lighter crude, but introducing the documented problems associated with Bakken characteristics that are not present in, for example, Alaskan crude.

Other impacts aside from CO<sub>2</sub> emissions and energy use were also described in the International Council's report on impacts of varying crude slates. The table entitled Exhibit 11 inserted on the next page from the International Council report described above, identified varying refinery *product outputs* caused by varying *crude oil slate inputs*. In other words, the amount of gasoline, diesel, jet fuel, coke, sulfur, light gases, naphtha, resid, and aromatics produced at the refinery varied depending on the variation of crude oils into the refinery.

That means that the impacts associated with each of these different operations change with different crude oil inputs, and these impacts must be evaluated for the Tesoro project, after providing the baseline crude slate, and comparing it to the proposed potential changes in crude slate facilitated that the new Project allows. Some refinery processes involve light ends (which may for example have high benzene content, a known carcinogen), others involve heavy refinery components (which may for example be associated with higher particulate matter emissions, which increase death rates in the population). Others have high levels of odorous and hazardous sulfur compounds, or may increase fire or explosion risk. The pieces of the refinery are not interchangeable, and modifications to crude slate have impacts on the individual components of the refinery which should have been identified.

A report by Dr. Phyllis Fox on a crude by rail project to the Valero Benicia California refinery identified many impacts due to switches to "advantaged" crude oils, including increased metals, increased use of toxic BTEX compounds, and many other impacts in transportation and at the



refinery due to use of changing crude slates.<sup>29</sup> All the issues identified in this report should be evaluated for the Tesoro ND.

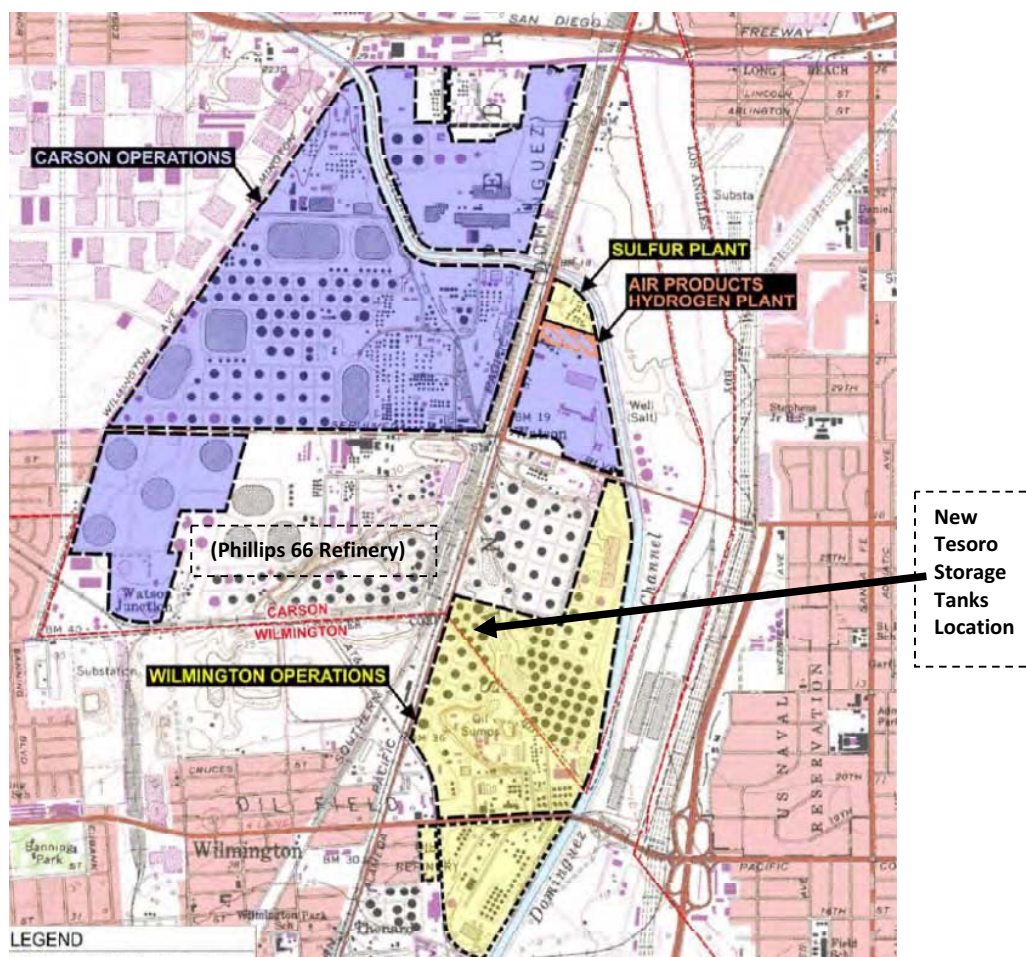
CEQA provides requirements for clear project descriptions and potential impacts. Even if Tesoro has permits that allow variations in crude oil types, if those variations can cause significant impacts, they still must be identified and evaluated under CEQA even if allowed by current limited permit conditions. CEQA provides additional protections not necessarily covered by AQMD permit conditions, and this kind of data must be available and transparent for the public CEQA process to be carried out.

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<sup>29</sup> Comments on the Initial Study / Mitigated Negative Declaration, Valero Benicia Crude by Rail, June 1, 2013, Dr. Phyllis Fox, attached, [http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report by Dr. Phyllis Fox.pdf](http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report%20by%20Dr.%20Phyllis%20Fox.pdf)

**B. Integrating the Wilmington and Carson refinery units and logistics operations is related to the Project, and has the potential to cause major impacts**

This map from the Negative Declaration shows the close proximity of the **Tesoro Wilmington and Tesoro Carson refinery operations**, with many residences shown in pink surrounding these facilities (and with labels added for the new Tesoro storage tanks, and the Phillips 66 refinery, next door):



When Tesoro purchased the BP Carson refinery, it planned to take advantage of marine operations to allow changes in crude oil feedstock to feed into the whole refinery complex, and specifically planned to integrate the Carson and Wilmington refineries and the Tesoro and BP “logistics” assets (which provide transportation and storage of feedstocks and products).

Tesoro planned to transfer intermediate feedstock to Carson’s cokers and other changes, facilitated by the new storage tank expansions. Tesoro also planned to use BP terminals / “logistics” assets for its own materials, and even to use these terminals to sell excess capacity to

third parties (not even mentioned in the ND). Tesoro should have identified these operations for the ND evaluation. Tesoro has further stated:<sup>30</sup>

*Integrating the BP assets, specifically the logistics, is expected to drive significant value throughout the West Coast system. **The Carson refinery has the only very large crude carrier, or VLCC, capable to dock on the West Coast. We will be able to leverage the broader crude oil sourcing optionality and reduce long-haul shipping costs throughout the Tesoro West Coast system.***

*VLCC freight economics on a per barrel basis typically reduce long-haul shipping costs by between \$1 and \$2 per barrel. **Having this capability will allow us to source more economic alternatives to Alaska North Slope crude oil, which has been a significant component of that Carson refinery's historical crude oil slate. We also anticipate benefiting from Carson's two additional cokers, allowing us to further optimize intermediate feedstock transfers between our refineries. We expect feedstock optimization synergies to account for 40% to 45% of the fully-realized synergies.***

*The primary focus of product synergies is delivering the combined regional production sales volumes to end users in the most efficient way possible. Today, Tesoro uses third-party logistics assets to distribute a significant amount of our product volume. **Post close, we intend to drive much of that volume through BP's logistic asset, which have excess capacity. In fact, under the operation of Tesoro Logistics, we feel we can drive additional third-party volume through the combined, historically proprietary, logistics network. We expect these cost improvements to account for 15% to 20% of the total synergies.***

*As we look at the potential for operating synergies, we are confident that significant value can be created through the combination and reconfiguration of the Carson and Wilmington refineries. One expected benefit is increased clean product yields and greater flexibility between gasoline and distillate production, with a focus on distillates. We expect a combined shift of about 25% in our capability to supply market demand for diesel. With about 10% coming from optimizing the combined assets and the remaining 15% resulting from capital investment. This will allow Tesoro to meet the growing demand for distillate fuel on the West Coast. In addition to our plan to lower manufacturing costs in California prior to the acquisition, we also plan to lower costs as a result of the combined operations.*

This discussion and others documented earlier in this comment also show that the overall “logistics” capacity must be evaluated in total, since increased storage in one part of the Tesoro properties can further free up capacity in other parts of its local complex, and also facilitate third party activities and the “reconfiguration” of the two refineries described by Tesoro.

The previously cited Tesoro February 2014 report to the SEC also again identified the integration of the refineries, the “Logistics” operations, and marketing operations.

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<sup>30</sup> Thomson Reuters Streetevents Edited Transcript, TSO - Tesoro Corporation to Purchase BP's Fully Integrated Southern, California Refining and Marketing Business - Conference Call, August 13, 2012, [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDEQFjAC&url=http%3A%2F%2Fphx.corporate-ir.net%2FExternal.File%3Fitem%3DUGFyZW50SUQ9NDc4MzEzZfENoaWxkSUQ9NTEExNDM1fFR5cGU9MQ%3D%3D%26t%3D1&ei=ocCPU4zaB4iOqAb\\_t4LQDA&usq=AFQjCNH0VQpiMISfBGmaQGNahNO-GBPVsw&sig2=XfnG0PAyBnflWz\\_ud2tniA&bvm=bv.68235269.d.b2k](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDEQFjAC&url=http%3A%2F%2Fphx.corporate-ir.net%2FExternal.File%3Fitem%3DUGFyZW50SUQ9NDc4MzEzZfENoaWxkSUQ9NTEExNDM1fFR5cGU9MQ%3D%3D%26t%3D1&ei=ocCPU4zaB4iOqAb_t4LQDA&usq=AFQjCNH0VQpiMISfBGmaQGNahNO-GBPVsw&sig2=XfnG0PAyBnflWz_ud2tniA&bvm=bv.68235269.d.b2k)

*During 2014, we plan to continue to focus on our strategic priorities described above by:*

- *delivering the improved California synergies, resulting from our acquisition and integration of the Southern California refining, marketing and logistics business; . . .*

***Tesoro Logistics LP***

*TLLP was formed to own, operate, develop and acquire logistics assets to **gather crude oil and distribute, transport and store crude oil and refined products.** [Emphasis added throughout]*

**These plans, put forth so publicly, repeatedly, and recently, before and after the purchase of the BP properties, should have been disclosed in the ND as part of the Project.** The ND is entirely at odds with this public description of Tesoro's own plans. Existing permit conditions listed in the ND are not sufficient to prevent these major refinery changes for which the storage tanks are needed.

The ND identifies the following existing permit conditions and makes very generalized conclusory statements that the Project is not for other purposes, but the ND does not provide the baseline evidence necessary to substantiate these claims, that are so in conflict with the evidence of Tesoro's own statements:

- The existing Tanks 80035 and 80036 are both currently permitted to store petroleum materials including crude oil, hydrocracking unit (HCU) feedstock (a light gas oil . . .
- The two new tanks are proposed to be permitted to store light and heavy crude oils of varying vapor pressures up to 11 pounds per square inch (psi), light gas oils such as HCU feedstock and fluid catalytic cracking unit (FCCU) feedstock, and heavy gas oil
- Tank 80038 is currently permitted to store petroleum distillate products with true vapor pressures less than 0.5 psi such as crude oil and heavy gas oils and is not connected to the vapor recovery system. Tank 80038 currently primarily stores vacuum gas oil, a heavy gas oil. The proposed modifications to Tank 80038 would change the type of commodity to be stored in the tank to also include light gas oil and connect Tank 80038 . . .
- All modifications associated with the proposed project will occur within the confines of the Wilmington Operations . . .
- . . . no modifications will occur at the Carson Operations.
- The proposed project was conceived, and the applications for the proposed project were submitted to the SCAQMD prior to Tesoro's acquisition of the Carson Operations.
- The overall amount of crude oil delivered to the Wilmington Operations will not change from current operations.
- The proposed project will not increase the total amount of crude oil delivered to the Wilmington Operations on an annual basis and will not alter the methods of

crude oil delivery because crude oil will continue to be delivered via ships and pipeline.

- No modifications are proposed to the existing crude oil delivery pipeline from the Marine Terminal. Further, no other pipelines that deliver crude or any other product to the Wilmington Operations will be modified as part of the proposed project.
- Further, Tesoro is not proposing to change the crude oil throughput of the Wilmington Operations or any downstream refining processes because crude oil storage capacity is not a limiting factor for the throughput and production at the Wilmington Operations.
- Refining operations fluctuate and are controlled by many factors, including but not limited to, equipment design parameters, market demand, equipment maintenance schedules, equipment permit limit conditions, and crude oil characteristics (e.g., sulfur content, acidity, specific gravity, etc.).
- . . Tesoro has operated the refining processes at the Wilmington Operations at the maximum capacity in the past and are expected to continue to operate up to or at maximum capacity in the future. Therefore, the baseline crude oil throughput rate and product output of the Wilmington Operations on a daily or an annual basis would not change as a result of implementing the proposed project.
- The refining capacity of the Wilmington Operations is constrained by a number of factors including equipment design parameters, market demand, equipment maintenance schedules, equipment permit limit conditions, and crude oil characteristics (e.g., sulfur content, acidity, specific gravity, etc.).
- The refining capacity is based on the overall design of the refining processes within the Wilmington Operations.
- The heat required to first separate crude oil into various intermediate products, which are later refined further, dictates the amount of crude oil that can be processed overall by the Wilmington Operations.
- Specifically, the Crude Unit, the first step in the refining process, receives the crude oil directly from storage (i.e., from both the existing and proposed storage tanks), has operating limits on the heater, which limits the amount of crude oil that can be processed.
- The Crude Unit operations fluctuate based on conditions of other process units within the Wilmington Operations, market demand, and crude oil characteristics.
- The Crude Unit heater routinely operates at various firing rates and will continue to operate at various firing rates, which is considered to be the baseline at the Wilmington Operations, and the proposed project does not include modifications to the Crude Unit throughput or heater firing rate.

The reasoning that no modifications will occur at the Carson refinery is conclusory, because the Project is currently self-defined as only including the pipe and storage tank increases.

The reasoning that operations “fluctuate” based on “conditions of other process units, market demand, and crude characteristics” is always true of every refinery. This general statement by no means precludes environmental impacts occurring.

No timeline or size of such fluctuations is identified in the ND, so they could be unlimited. Baseline periods and quantification of degree of fluctuations should be identified.

Such fluctuations in crude oil characteristics were identified in the literature previously cited as directly causing environmental impacts.

No baselines were provided for crude oil sulfur, metals, paraffin, or carbon content, or for any crude oil characteristics whatsoever.

Neither does the ND identify whether existing permit conditions for the tanks or other parts of the refinery include any limits on such characteristics.

The ND does not provide any information on the baseline “heat” provided in the crude unit heaters mentioned in the ND.

The ND does not provide any information about when in the past the refinery was operated at “maximum capacity,” how maximum capacity is defined, how long ago this occurred, for how long this occurred, and at what percentage of the capacity the refinery is currently running.

Further, the ND does not identify the baseline levels of any other process units within the Wilmington refinery, or within the Carson refinery.

The ND does not identify whether there is existing piping connected to, or close to the Wilmington tanks that could bring materials in the future to the Carson refinery.

The ND does not identify whether the tankage increase in Wilmington could free up other tankage at either refinery, or that could be connected in the near future.

The ND does not identify whether such changes could change the yields of different units within the Carson or the Wilmington refinery.

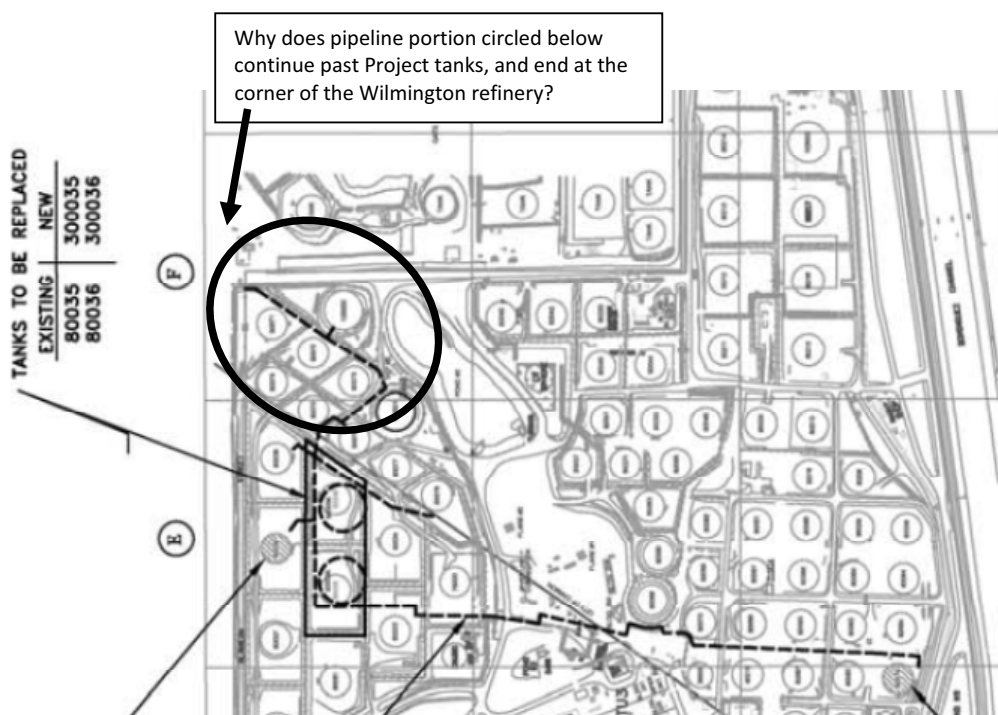
All these and more such details are essential to an evaluation of the Project and its impacts.

**C. The new pipeline across the Wilmington refinery to the Project storage tanks continues *past* the tanks to the corner of the Wilmington property closer to the Carson property, and next to a railway**

The ND states that the Project does not involve the Carson refinery, nor any transport by rail, or anything besides the pipeline and the storage tanks. But the new pipeline through the Tesoro facility is routed not only to the new tanks, but *beyond* them, to a corner of the refinery that is

close to the Carson portion of the refinery, and is also next to rail lines that traverse the length of the refinery between the Carson and the Wilmington operations.

I have circled the end of the pipeline route which was identified in the refinery layout map provided by the ND. The ND graphic shows an additional length of pipeline *beyond* the Project tanks, to the corner of the Wilmington refinery property, but provides no explanation about the potential for this extended pipeline to connect with additional refinery and logistics operations (including the Carson refinery, the adjacent rail yard, other storage tanks, and potentially even to trucking assets). There is also an extra leg of pipeline indicated without explanation, between two tanks that were not identified as part of the Project.



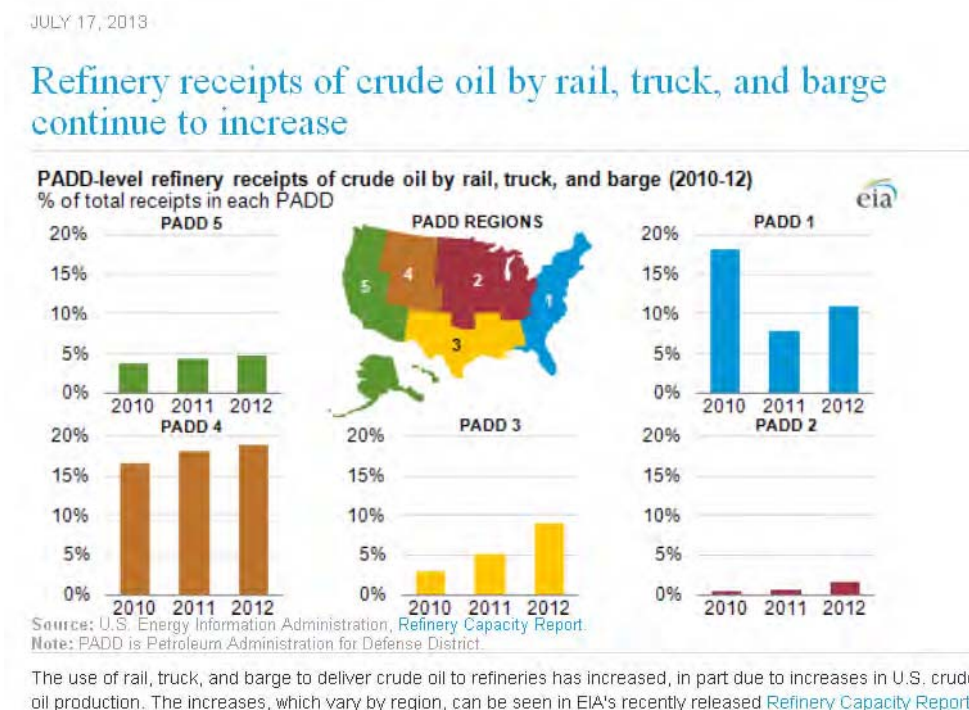
The ND must be recirculated as a full EIR, and the potential for connections to the Carson portion of the refinery must be identified. Existing nearby pipelines and connections, plans made known to the AQMD of such connections, and the general potential for such connections that the Project facilitates must be evaluated.

In addition to the potential that the storage tanks and pipeline are located in close proximity to the Carson refinery, they are also next to a rail line which runs from top to bottom to the left of the diagram above. The US Energy Information Administration website provides the following charts<sup>31</sup> showing the steady increase of alternative forms of crude oil delivery to oil refineries instead of ship (rail, barge, and truck), including in California. The ND states that Tesoro does not currently transport crude by rail to the Wilmington refinery (at 1-1), but that does not

<sup>31</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=12131>

preclude the Project from facilitating such a project in the near future, especially given the proximity of the tanks to a rail line. The potential to connect in the future to other local rail should also have been discussed.

Further, Tesoro owns major truck terminal assets. The ND does not provide any information about any applications in process related to truck terminals, baseline activities, potential connections to other transport modes, or the potential for the increase in storage to be connected to Tesoro’s terminal. While ship is the more obvious choice at this time, the potential for flexibility of these storage tanks for Tesoro to connect with other transport such as rail and truck should also have been evaluated in the ND.



However, the most crucial omission was the failure to evaluate the Project’s role in the integration of the Wilmington and Carson portions of the refinery complex.

**D. Volumes and throughput are also publicly planned to increase at the Southern California Marine Terminals according to Tesoro**

As described earlier, and also in Tesoro’s May 1, 2014 earning call, Philip Anderson, President of Tesoro Logistics LP identified increases in the volumes that its terminals will handle (not just the speed of offloading), increasing throughput capacity<sup>32</sup>:

<sup>32</sup> Thomson Reuters Streetevents Edited Transcript, TLLP – Q1 2014 Tesoro Logistics LP Earnings Conference Call, May 1, 2014, pp .6-7.



*“We have two of our terminals are being expanded to handle additional capacity, and those expansions will come online this summer. And that will allow us to bump up volumes either very late in the second quarter or early in the third quarter.” . . .*

*“Our marine facility down there [Long Beach], 121, which is the large neighbor de-berth in Long Beach, stays pretty full. We have our legacy to Long Beach terminal [Marine Terminal] that is adjacent to our newly acquired, what we call, P-2 in Long Beach. And between P-2 and our legacy Long Beach terminal, we probably have an additional 100,000 plus barrels per day of throughput capacity.”*

The ND can't legitimately cut the baby in half – the reason for the increase in offloading through a much larger pipeline and into much larger tankage is admittedly a planned throughput increase in Tesoro's marine terminals.

Tesoro will be enabled to offload over 12 times as fast from its marine loading operations to the new and expanded onshore storage tanks through the Project's expanded 42-inch pipeline. Not only will this enable increased *speed* of offloading, it will free up the terminals to allow scheduling of additional ships to port for offloading at these large storage tanks.

As previously discussed, the US Department of Transportation found that all modes of transportation for Bakken crude need to assess the safety hazards it poses. Further, the AQMD must also evaluate the hazards involved with the transport by ship of heavy tar sands crude, and the diluents that come along with it.

#### **E. The Project has the potential to increase coking**

As identified above, there is a major potential to increase the proportion of heavy crude oil from Canada, which would increase coking. The AQMD performed source tests at South Coast refineries and found the following emissions (in lbs per coking cycle).<sup>33</sup> Coking cycles at least once a day. While the AQMD adopted a regulation to reduce these emissions, final deadlines of the regulation are in 2019, so increased coking in the meantime will mean increased impacts from VOCs, particulate matter, sulfur compounds, and the greenhouse gas methane from these operations, which were not evaluated in the EIR. First the ND needs to provide information about the crude slate baseline and coking baseline so that the degree of increased coking can be identified.

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<sup>33</sup> Proposed Rule 1114 Working Group Meeting, September 27, 2012, Petroleum Refinery Coking Operations (staff presentation, Slide 4)

## AQMD Source Test Results

Company	Test Initial Drum Vent Pressure (psig)	-- lbs/cycle --				
		VOC	PM	Condensable PM/VOC	Sulfur Compounds	Methane
BP	0.89	4.44	3.77	0.66	8.18	165.47
Chevron	0.4	11.16	1.25	12.50	N/A	66.96
Conoco <sup>1</sup>	N/A	N/A	N/A	N/A	N/A	N/A
ExxonMobil <sup>2</sup>	11	1.38	0.34	0.54	N/A	12.72
Tesoro	7	5.3	0.36	1.46	N/A	34
Valero	3.9	4.28	0.26	0.46	0.45	1.86

1. Vent time very short, no sample was obtained

2. Results inconclusive, test was out short due to safety concerns

### F. The increased Storage Tanks themselves have significant impacts, for example, due to the increased tank and pipeline size causing increased risk from fires and earthquakes

The Project treated earthquakes and fires as separate issues. This provides an unrealistic probability that oil and gas fires would occur. The Project instead should be considered to cause a significant increase in the probability of oil and gas fires due to the imminent earthquake hazard. Oil and gas fires are very difficult to extinguish, and could easily spread. Such fires can emit large clouds of hazardous black smoke over the region.

Obviously, the risk of explosion and fire due to Bakken crude oil represents much increased risk, as previously discussed. However, just the increased size of the tankage increases the volume of material vastly, which of course increases the impacts when a fire or explosion occurs, regardless of the type of crude oil present.

A major earthquake is not just a theoretical possibility. The risk of a major earthquake in the region is imminent and severe. A September 2005 Los Angeles Times article,<sup>34</sup> *Katrina's Aftermath, California Earthquake Could Be the Next Katrina*, reported:

“A state study published last year on hazard reduction paints a sobering picture of California's earthquake danger. About 62% of the population lives in a zone of high earthquake danger, including 100% of the population of Ventura County, **99% of Los Angeles County** and 92% of Riverside County. . . .

“**Researchers at the Southern California Earthquake Center said there is an 80% to 90% chance that a temblor of 7.0 or greater magnitude will strike Southern California before 2024.**”

<sup>34</sup> September 10, 2005, Los Angeles Times, KATRINA'S AFTERMATH, California Earthquake Could Be the Next Katrina, by Jia-Rui Chong and Hector Becerra, Times Staff Writers, <http://www.latimes.com/news/local/la-earthquake08sep08,1,2126004.story?coll=la-util-news-local>

The Southern California Earthquake Center (at the University of Southern California)<sup>35</sup> (SCEC) earlier found:<sup>36</sup>

*“The last official estimate of earthquake potential in southern California was the 1988 report of the Working Group on California Earthquake Probabilities. The report estimated the probabilities of large “characteristic” earthquakes on major faults, like the San Andreas and San Jacinto faults. The report concluded that there is a 60% chance of at least one large earthquake ( $M > 7$ ) on the San Andreas fault before the year 2018.*

***The report concluded that the probability is even higher, 80-90%, when other faults are included.*** Such an earthquake could occur today. Severe ground shaking will occur during the inevitable major earthquake in Los Angeles area. Los Angeles’ soil types cause increased ground shaking:<sup>37</sup>

The Uniform Building Code does not prevent significant and even severe earthquake damage. In an Environmental Impact Report performed for Industrial Service Oil Company, Inc. (ISOCI) of Los Angeles, the potential for damage to structures (including oil treatment and storage structures) was identified, despite the fact that the facility stated it would comply with the Uniform Building Code:<sup>38</sup>

***Based on the historical record, it is highly probable that the Los Angeles region will be affected by future earthquakes. Research shows that damaging earthquakes will be likely to occur on or near recognized faults showing evidence of recent geologic activity.***

*The impacts of an earthquake on the site are considered to be greater than the current conditions since additional structures will be constructed including new treatment and storage facilities. **Impacts of an earthquake could include tank and other structural failure.***

*Additional structures at the site must be designed to comply with the Uniform Building Code . . . The goal of the code is to provide structures that will:*

- (1) Resist minor earthquakes without damage;*
- (2) resist moderate earthquakes without structural but with some non-structural damage; and*

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<sup>35</sup> SCEC (at the University of Southern California) gathers and combines new information about earthquakes in Southern California, is supported by the National Science Foundation and the U.S. Geological Survey, and coordinates efforts of over 50 institutions

<sup>36</sup> *Seismic Hazards in Southern California: Probable Earthquakes, 1994-2024*, Presentation and Panel Discussion Held at the OES Conference, “Northridge Earthquake--One Year Later,” January 20, 1995, Southern California Earthquake Center, <http://www.scec.org/news/newsletter/issue11.pdf>

<sup>37</sup> *“Another project in progress will update this map by showing a higher level of shaking for soft-soil sites. This will lead to a higher rate of damaging shaking because the more common smaller earthquakes will produce greater shaking in soft soil. The result will be to increase slightly the rates for the sedimentary basins such as the Los Angeles basin and the San Gabriel, Ventura and San Bernardino Valleys.”* Seismic Hazards Map for Southern California, Southern California Earthquake Data Center, <http://www.data.scec.org/general/PhaseII.html>

<sup>38</sup> Draft Environmental Impact Report for the Industrial Services Oil Company, Inc. (ISOCI) Hazardous Waste Facility Application, November 2005, page 3-58

(3) *resist major earthquakes without collapse but with some structural and non-structural damage. . . .*

Thus, the ISOCI EIR found that an earthquake in the region could cause tank and other structural failure, and also found that the Uniform Building code does not preclude all damage from earthquakes. It found that the Code is only meant to cause *resistance* to earthquake damage and collapse. These same risks exist at the proposed Oxy site.

A discussion of remaining risks which exist after compliance with the Uniform Building Code was provided in a publication by Dr. Robert J. Kuntz, President of the California Engineering Foundation, and Daniel L. Tanner, the California Engineering Foundation's Economic Consultant. This document found:<sup>39</sup>

**The California Building Code offers only minimal protection from seismic damage,** i.e., a structure should not be damaged in a minor earthquake, damaged beyond repair in a moderate earthquake, nor collapse in a major earthquake. However new technologies, such as seismic isolation, can mitigate both structural and building contents damage and are becoming available to government and industry. There is a need for design professionals, building officials, planners, and building owners to become aware of these new technologies, the criteria for their use, and how to incorporate them into practice.

**The Uniform Building Code provides minimal seismic protection determined acceptable by local governments, but Code specifications do not prevent structural damage nor ensure the use of a building after an earthquake.**

Such limited protection is not consistent with the needs of commerce or emergency facilities, which must remain operational after an earthquake, nor does it protect the contents of a building. Two earthquakes which struck near the Lawrence Livermore National Laboratory in California, within two days of each other in January of 1980, caused a total of \$10 million in damage. Nearly half of the damage was to laboratory equipment, testing systems, and other building contents.

As an illustration of the potential damage that can occur in an industrial area during a major earthquake, the 1999 earthquake in Turkey was evaluated by the Pacific Earthquake Engineering Research Center. An excerpt of a report on this study is provided below. The report found "*The earthquake struck the industrial heartland of Turkey.*" It found that complete structural failures due to earthquake were few in number, but severe damage short of complete structural failure did occur. One example was the failure of floating roofs in crude oil tanks.

Such fracturing and crumpling of support structures and other earthquake damage to industrial equipment not only cause leaks and spills, but could easily cause fires. Even in residences, fires during earthquakes are a known common hazard due to leaking natural gas, broken structures and electrical systems, ignition sources, etc. When damage occurs during major earthquakes to heavy industrial facilities that store, transfer, and process combustible materials, there is even more potential for dangerous fires. The Turkish example included a fire during the 1999

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<sup>39</sup> Disaster Recovery Journal, 1999, [http://www.drj.com/drworld/content/w2\\_066.htm](http://www.drj.com/drworld/content/w2_066.htm)

earthquake when a refinery cooling tower failed, and also when eight naphtha- storing fuel tanks burned.

A publication funded by the Earthquake Engineering Research Institute and the Washington Emergency Management Division (2005)<sup>40</sup> found severe damage due to earthquakes, including long term environmental impacts of hazardous material releases. The Report found:

Fire following the earthquake caused severe damage to the Tüpras refinery. Other observed structural failures in the refinery were to a 115-m-tall smokestack, floating roofs in crude oil tanks, and piles supporting a jetty. Substations and one power generation facility suffered damage ranging from overturned transformers to fractured porcelain switches.”

Another publication described the Kocaeli fire, the tank structural damage, fire and collapse, and oil spilled into the sea, and major equipment including a large boiler knocked off its foundation:<sup>41</sup>

*Fig. 5. Fire damage to naphtha tanks at Tüpras refinery.*



In addition to the risk of fires associated with earthquakes well known to California regulators (as well as those documented after the Turkish earthquake), a publication of the University of Patras, Greece -- *Safeguarding Hydrocarbons Inside Local Earthquake Defense Systems*<sup>42</sup> --

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<sup>40</sup> *Scenario for a Magnitude 6.7 Earthquake on the Seattle Fault, A Project Funded by the Earthquake Engineering Research Institute and the Washington Emergency Management Division, February 2005, Excerpts from a publication of the same title to be released March 2005*, page 20, <http://seattlescenario.eeri.org/documents/EQ%202-28%20Booklet.pdf>

<sup>41</sup> *PEER Center News*, Vol. 2 No. 4 October 1999, <http://peer.berkeley.edu/news/1999october/turkey.html>, excerpt. *PEER Center News* is a quarterly publication of Pacific Earthquake Engineering Research Center, highlighting research and information of interest to earthquake engineering researchers and professionals. <http://peer.berkeley.edu/news/1999october/turkey.html>

<sup>42</sup> *Safeguarding Hydrocarbons Inside Local Earthquake Defense Systems*, Project participants: UPS: Seismology Centre, University of Patras, Greece, UEA: School of Environmental Sciences, University of East Anglia, Norwich, England, DEPA: The Public Gas Company of Greece, GSCP: The General Secretariat of Civil Protection, AGISCO, Aspinal & Associates, and ECS: Euroconsultants,

found major fire risks from earthquakes associated with burning hydrocarbons to be a general problem around the world:

*“Hydrocarbons, particularly gas, also create a much increased risk of fire as a major secondary consequence following earthquake damage. There is a growing danger that major Greek cities may experience fire damage after a strong earthquake, enhanced by the increased supply of gas into urban areas. Fires following the earthquake at Kobe in Japan 1995 and Turkey 1999 (Fig.1,2) provided a salutary example of impact even in a well-regulated, modern and earthquake conscious country. Longer memories recall the conflagration in Tokyo that followed the 1923 Kwanto earthquake.”*



The new tanks could be used for Bakken or Canadian Tar Sands crude oil according to Tesoro's plans. Bakken crude oil has been shown to be explosive (as in the tragic Lac Megantic rail explosion). It is indisputable that fires and explosions, especially due to earthquake must be evaluated in a new ND related to Tesoro's and Tesoro Logistic's plans to bring Bakken crude oil into its facilities and crude oil tanks.

But even with heavy Canadian Tar Sands crude that Tesoro may switch to, an earthquake or other impact could cause a major oil fire. (And that is without considered the addition of volatile diluents added to tar sands crude, which should have been considered.)

An example of severe fires at a facility processing heavier grades of oil includes the Third Coast Industries fire in Houston Texas. The U.S. Chemical Safety and Hazard Investigation Board came to the conclusion that higher flash point (“non-ignitable”) materials such as heavy oils can represent major fire hazards.<sup>43</sup> This agency concluded after evaluation of the huge 2002 automotive fluid blending plant fire in Texas, that oils with flash points greater than 200°F classified as “Combustible IIIIB” (including motor oils) should be treated with more care regarding fire safety. The Texas fire under investigation could not be put out, and completely destroyed the facility.

In the Texas case, the Chemical Safety Board found that while most of the material onsite at this facility had higher flash points (meaning they were heavier, less volatile materials), the presence of small amounts of some liquids which were more easily combustible with lower flashpoints, could have caused the fire to start, and then combusted the bulk of the higher flashpoint materials. The Chemical Safety Board found that such higher flash point oils burn “fiercely” once a fire is started.

**The Board concluded that fire codes and workplace safety regulations should apply more controls to combustible liquid storage and handling.** In the aftermath of the Third Coast fire, the Board communicated its concerns in correspondence to the U.S. Occupational Safety and Health Administration (OSHA). The Chemical Safety Board also found:

. . . the facility was not designed to contain the contaminated runoff that could result from fighting the fire with water. Fire officials therefore decided they had no choice but to let the plant burn, and they focused on protecting nearby homes from destruction.

A 2005 oil depot fire in the Hertfordshire in the United Kingdom also illustrates how severe offsite impacts from smoky oil fires can be. The inefficient burning of petroleum products at this site caused huge smoking plumes similar to smoking which could occur at the Warren facility if a fire were to break out, due to earthquake or other reasons.<sup>44</sup>

The Hertfordshire Oil Terminal fire showed that such fires cause huge smoky plumes due to poor combustion of hydrocarbon materials. Smoke from an oil fire and/or hazardous materials burning could cause major emissions of particulate matter, PAHs (Polycyclic Aromatic Hydrocarbons), sulfur oxides, heavy metals including lead, mercury, and chromium, chlorinated compounds including deadly dioxins, and many other hazardous compounds.

Smoky fires and gas plumes from such an event could reach nearby residential areas and impact workers offsite and onsite, and could billow for miles. Even a moderate fire could heavily impact

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<sup>43</sup> *Third Coast Industries Fire*, Brazoria County, Texas May 1, 2002, U.S. Chemical Safety and Hazard Investigation Board, CSB Investigation Digest, <http://www.csb.gov/third-coast-industries-petroleum-products-facility-fire/>

<sup>44</sup> [http://en.wikipedia.org/wiki/2005\\_Hertfordshire\\_Oil\\_Storage\\_Terminal\\_fire#Causes](http://en.wikipedia.org/wiki/2005_Hertfordshire_Oil_Storage_Terminal_fire#Causes)

neighbors and schoolchildren, especially people with respiratory problems, asthma, or heart conditions, but could also significantly impact healthy adults. The impact would depend on fire size, availability of the fire department (which may not be the case in an earthquake), and how long it takes to put out the fire. In the event of an earthquake, the public has been repeatedly informed that emergency services may not be available for some time, due to obstructions on roadways, and broken water supplies.

The potential of such hazards due to a major earthquake must be evaluated in an EIR.

#### **G. The approximate mile-long expanded pipeline from the Marine Terminal to the Wilmington refinery tanks increases earthquake risks**

The ND fails to evaluate the increased volume of crude oil present in the pipeline at any one time, and the increased risk of spill this would cause, especially due to earthquakes. It relies on a stated assumption that annual transport would stay the same (which is also contradicted by Tesoro's published plans, and not inherently true unless specific new conditions are set).

See the discussion above about risks of fires and explosions related to Bakken and Canadian Tar Sands Crude oil in the new expanded storage tanks. The same concern applies due to the large amount of petroleum material that would be added to the approximately mile-long pipeline from the marine terminal to the tanks. Compliance with building codes is meant to reduce risks, but is not considered to eliminate earthquake risk. The ND was wrong in its failure to consider the combination of fire and explosion from earthquakes, which would obviously be increased due to the higher volumes of materials that would be present. The smoky black plumes caused by oil fires contain particulate matter, PAHs (Polycyclic Aromatic Hydrocarbons) and many other harmful compounds that should have been evaluated in the ND with regards to oil fire risk that will certainly be significantly elevated due to the Project increases.

#### **H. Other Potential Project Impacts**

Evaluation of the following should be added, especially given the changes in crude slate planned by Tesoro:

- Tank cleaning and degassing: Storage tanks must be periodically cleaned. Emissions from tank cleaning operations for preparation for the modifications of the existing tanks, and later tank cleaning during ongoing operation of both existing and new tanks, was not identified and assessed. Because refinery crude oil storage tanks are very large, and over time crude storage results in accumulation of heavy sludge (called tank "bottoms"), this must periodically be cleaned and removed. SCAQMD Rule 1149 (Storage Tank and Pipeline Cleaning and Degassing) controls but does not eliminate these emissions from the extremely large volumes of hydrocarbon product in these tanks.<sup>45</sup> Tank cleaning and degassing protocols and frequency should be identified and emissions calculated.

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<sup>45</sup> Final Environmental Assessment: Proposed Amended Rule 1149 – Storage Tank and Pipeline Cleaning and Degassing, April 2008, SCAQMD <http://www.aqmd.gov/ceqa/documents/2008/aqmd/finalEA/FEA1149.pdf>



In addition, the Hydrocarbon Processing article (Innovative Solutions) identified storage tank waxy buildup and sludge as a specific problem with shale oil storage, with a solution to use chemicals to break up the waxes. The impacts, effects on tank operation and cleaning, and impacts of solutions such as chemicals used to break up waxes, should also be evaluated in an EIR process.<sup>46</sup> Furthermore, impacts related to tar sands storage and tank cleaning, including heavy tank bottoms, and use of diluents must be addressed.

- Pipeline cleaning and degassing: Pipelines are also periodically cleaned and degassed, and in this case, emissions would likely occur not only during future pipeline operation and maintenance activities, but also during the construction connection process with the new tanks. Again, Rule 1149 applies, but does not eliminate all emissions. Further, shorter runs of pipe are exempt, as described in the SCAQMD staff report, and so would not be controlled.<sup>47</sup> Identification of the pipeline lengths, connectors, construction activities, operation, and maintenance activities, including cleaning and degassing, and fugitive emissions from connectors should be specifically described and emissions quantified.
- Flaring of tank and pipeline gases: If flares are used to control degassing emissions for tanks and pipelines, the gas volumes, flare hydrocarbon destruction efficiency, and remaining VOC emissions from flaring should be identified (as well as NOx, SOx, particulate matter, and other emissions).
- Unplanned process shutdowns: Because unconventional crude oils can reduce run-time to half that of planned turnarounds (planned maintenance schedules) as identified in the earlier-cited Oil & Gas Journal article, this means additional air emissions. Unplanned refinery shutdowns increases startup / shutdown and maintenance emissions include increased flaring emissions, potential pressure relief device venting to atmosphere, and also increase the risk of fires and explosions with many associated emissions (not only VOCs, but particulate matter, hydrogen sulfide, all the criteria pollutants, toxics including PAHs (polycyclic aromatic hydrocarbons), and many more). They also increase safety risks for workers and neighbors)

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<sup>46</sup> “Due to the variation in solids loading and their paraffinic nature, processing shale oils in refinery operations offers several challenges. Problems can be found from the tank farm to the desalter, preheat exchangers and furnace, and increased corrosion in the CDU. In the refinery tank farm, entrained solids can agglomerate and rapidly settle, adding to the sludge layer in the tank bottoms. Waxes crystalize and settle or coat the tank walls, thus reducing storage capacity. Waxes will stabilize emulsions and suspend solids in the storage tanks, leading to slugs of sludge entering the CDU. Waxes will also coat the transfer piping, resulting in increased pressure drop and hydraulic restrictions.”

<sup>47</sup> At p. 1-13

**IV. Conclusion – Potential Impacts are large, have not been mitigated, no alternatives or Cumulative Impacts were analyzed, and an EIR must be developed**

My conclusion is that there is an abundance of evidence on the deficiencies in the Project Description and the missing significant environmental impacts due to the full actual Project. Accordingly, AQMD is required to prepare a full EIR. Because the ND incorrectly portrayed this Project as relatively a minor change, numerous impacts are either understated or missing. Mitigation, Cumulative Impacts and Project Alternatives to avoid these significant impacts were not evaluated.

Tesoro statement:

“When you think about formalizing competitive advantage and fully integrating our value chain, that is really what the Los Angeles Integration and Compliance Project is about. And when we think about creating value, we are not just thinking about advantaged crude oils in front of our refineries, but we're thinking about how that supply to the west coast of advantaged crude oils can change the shape of the crude oil supply/demand dynamics for the west coast. And that's what we are trying to accomplish through Vancouver Energy.”<sup>1</sup>

Tesoro slides:<sup>2</sup>

### Strategic Investments for Distinctive Value

- **Creating advantage through integration**
  - Los Angeles Refinery Integration and Compliance Project
- **Changing the West Coast crude oil supply dynamics**
  - Vancouver Energy Project
- **Capturing higher margins in a high growth market**
  - West Coast Mixed Xylenes Project
  - Anacortes Isomerization Project



### Supplying Advantaged Crude Oil to the West Coast

**Vancouver Energy Project**


- Joint venture with Savage Companies
- Up to 360 MBD Rail-to-Marine Terminal
- Most efficient route to West Coast for Bakken crude oil
- Significant infrastructure exists; low development cost

**Strategic Crude Supply**

- Increases West Coast competitive crude supply
- Relative refining values of \$3 to \$5 per barrel

**Logistics Growth**

- Potential assets for offer to TLLP
- Tesoro a major, dedicated customer
- Significant third party revenue



**Estimated Project Details**

- CAPEX \$200 million<sup>1</sup>
- EBITDA \$100 million<sup>2</sup>
- Tesoro IRR 40%+

<sup>1</sup> Edited Transcript TSO - Tesoro Corporation 2015 Analyst and Investor Day, December 09, 2015, p. 10, available at <https://www.google.com/search?q=EDITED+TRANSCRIPT+TSO+-+Tesoro+Corporation+2015+Analyst+and+Investor+Day+EVENT+DATE%2FTIME%3A+DECEMBER+09%2C+2015+%2F+2%3A00PM+GMT&oq=EDITED+TRANSCRIPT+TSO+-+Tesoro+Corporation+2015+Analyst+and+Investor+Day+EVENT+DATE%2FTIME%3A+DECEMBER+09%2C+2015+%2F+2%3A00PM+GMT&aqs=chrome..69i57.471j0j4&sourceid=chrome&ie=UTF-8>

<sup>2</sup> Tesoro Presentations webpage, weblink: Morgan Stanley Corporate Access Day, 5/12/16, Slideshow entitled: *Driven to Create Value, Morgan Stanley Refining Corporate Access Day, May 2016*, Slide 13 & 15, available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> , Attachment XX

**Tesoro Public Relations Project Purpose description:<sup>3</sup>**

“Tesoro plans to invest \$460 million to physically connect, further integrate and upgrade our adjacent Carson and Wilmington facilities, so that our combined Los Angeles Refinery operates more cleanly and efficiently.

“Pending permitting and approvals, the Los Angeles Refinery Integration and Compliance (LARIC) project will improve air quality, substantially reduce local emissions, upgrade refinery equipment and provide significant benefits to the local economy.”

**Contrasts with Tesoro description to investors regarding new crude oil access:<sup>4</sup>**

“When you think about our portfolio, with almost 740,000 barrels a day of capacity on the west coast, we have a very large and competitive position . . . four excellent refineries with just absolutely superb waterborne logistics connectivity, so not only for crude oil, advantaged crude oil access up and down the coast . . .

“This is the Los Angeles Integration and Compliance Project, and, boy, it has been a pleasure. . . . this business is performing very, very well this year and it is going to contribute -- that region will contribute onwards of \$2 billion of revenue to our 2015 results

“. . . And then, we do two large pipelines, 45-inch bores going under two major transportation corridors, and I think all totaled it is something like 18 miles of pipe that we are putting in in these projects that will formally connect and unleash the full power of a full integrated site, and that's the exciting thing about this project.

**Tesoro and industry literature showed the same kinds of statements about crude oil transport when the Project was first brought out as part of a Negative Declaration in 2014 (before it was withdrawn under protest that it needed a full DEIR, and published again in the full 2016 DEIR):**

Morningstar report, July 2013:<sup>5</sup>

Specifically, Tesoro can dramatically improve the performance of Carson by optimizing its crude slate with light crude from the Bakken. . . .

Tesoro should gain further advantages from integrating Carson with the Wilmington refinery.

Increasing throughput of light and heavy discount crude from the Mid-Continent and Canada via rail will likely benefit Tesoro more, though. To this end, Tesoro recently entered an agreement to develop a 120 mb/d crude by rail and marine facility in Washington. *[later expanded to 360,000 bbls/day]*

<sup>3</sup> <http://www.tesorolaproject.com/aboutlaric/> , and during community meetings held by Tesoro.

<sup>4</sup> <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-transcriptsarchive>

<sup>5</sup> 7/24/2013 <http://analysisreport.morningstar.com/stock/archive?t=TSO&region=USA&culture=en-US&productcode=MLE&docId=604033>

Tesoro February 2014 slideshow:<sup>6</sup>

“Extending the advantaged crude oil to the West Coast,” and changing the Los Angeles operations crude oil feedstock from 15% California Heavy crude to “Potentially up to 50% California Heavy and Bakken” crude oil (Slide 13).

“Terminaling, Transportation, and Storage” will “Consolidate Tesoro volumes in Southern California distribution system” and “Open Southern California to third-party business”

**Tesoro Savage Vancouver Washington Terminal, recently given a two-year lease extension, is a key part of Tesoro West Coast plans to bring crude to its refineries, from the Bakken region, with options for Canadian crude.** The Tesoro/Savage Vancouver, Washington joint venture *Vancouver Energy Terminal* on the Columbia River is a crude-by-rail to oil tanker terminal. The Vancouver Energy website states:<sup>7</sup>

Tesoro and Savage formed a joint venture to build and operate the Vancouver Energy terminal, which will accept and ship crude oil that originates in the midcontinent of North America – including the Bakken formation – at the Port of Vancouver USA via rail. The crude oil will be temporarily and safely stored in secure tanks, then transferred to customers’ vessels, shipped by customers to West Coast oil refineries, and converted into transportation fuels and other products for U.S. consumption.

**The Tesoro Savage Vancouver Draft Environmental Impact Statement (DEIS) for the Tesoro Savage terminal states:**<sup>8</sup>

The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States.<sup>2</sup> (at p. ES-2)

. . . While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, it is assumed that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility.

**The Tesoro Savage Vancouver DEIS also states:**<sup>9</sup>

Starting in 2017, the proposed Facility could receive crude oil from any source with rail access to the Port; however, according to information provided by the Applicant, the most likely sources would be northern mid-continent crude oil produced in North

<sup>6</sup> Simmons Energy Conference, *Transformation through Distinctive Performance*, February 27, 2014, <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations> attached

<sup>7</sup> <https://www.vancouverenergyusa.com/>

<sup>8</sup> <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml>

<sup>9</sup> Tesoro Savage DEIS, Fact Sheet, <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml>

Dakota and Montana, and in Canada. An average of four unit trains per day would arrive at the proposed Facility.

CEO Greg Goff regarding the Vancouver project approval:<sup>10</sup>

“The hearings are formally set for the end of June through about 30 days, so the latter part of July,” he said. **“We expect a final Environmental Impact Statement to be issued this fall, followed by a recommendation to the Governor of Washington,”** Goff added.

Despite widespread public opposition to the Project, the lease renewal was granted by the Commission unanimously in April (*Vancouver Port Gives Oil Companies What They Want — More Time*).<sup>11</sup>

Tesoro announced in December of 2015 plans for added capacity to pump 65,000 bpd of crude oil out of the Bakken (N. Dakota region), and to store and transport this crude for West Coast use.<sup>12</sup>

Acquisitions include the 97-mile BakkenLink crude oil pipeline, which connects to several third-party gathering systems, a 28-mile gathering system in the core of the Bakken, “where most of the drilling in today’s low price environment is being done,” a 154,000 bpd rail loading and a 657,000 bbl storage facility in Fryburg.

***“We expect our enhanced system to provide Tesoro’s West Coast facilities with cost-effective access to advantaged crude oil and provide producers additional market access. . . .”*** Tesoro spokesperson Brendan Smith said in an emailed statement.

<sup>10</sup> May 6, 2016, S&P Global: Tesoro cuts 2016 spending on project permitting delays, <https://www.linkedin.com/pulse/sp-global-tesoro-cuts-2016-spending-project-delays-janet-mcgurty>

<sup>11</sup> Oregon Public Broadcasting (OPB), April 15, 2016, <http://www.opb.org/news/article/vancouver-port-oil-terminal-lease-extension/>

<sup>12</sup> *Tesoro plans to purchase Bakken pipeline, storage*, Jessica Holdman, Bismarck Tribune, Dec 17, 2015, <http://tsocorp.com/customers-and-suppliers/wholesale/terminals/>

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# Executive Summary

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Tesoro Savage Petroleum Terminal LLC (the Applicant) has submitted an Application for Site Certification<sup>1</sup> ([ASC] No. 2013-01) to the Washington State Energy Facility Site Evaluation Council (EFSEC) to construct and operate the Vancouver Energy Distribution Terminal Facility (proposed Facility or proposed Project) at the Port of Vancouver (Port) in Vancouver, Washington, located on the Columbia River (Figure ES-1). EFSEC is the state agency responsible for evaluating and making recommendations to the governor on approval or denial of certain major energy facilities in Washington.

This executive summary explains the purpose of the Draft Environmental Impact Statement (Draft EIS) in EFSEC's decision-making process, describes the Applicant's proposed Project and why it is being proposed, and presents a summary of the potential environmental impacts associated with the proposed Project (including rail transport of crude oil to the proposed Facility and transshipment of crude oil from the proposed Facility by vessel) if the proposed Project is approved. This executive summary also summarizes EFSEC's efforts to involve the general public; federal, state, and local agencies; and other interest groups during preparation of the Draft EIS.

During the site certification process, EFSEC functions as the Lead Agency responsible for complying with the procedural requirements of the Washington State Environmental Policy Act (SEPA; Washington Administrative Code [WAC] 197-11-938[1]). As authorized under WAC 463-47-090, the Applicant prepared a Preliminary Draft EIS for EFSEC review, together with supporting technical information. EFSEC subsequently prepared the Draft EIS with the assistance of an independent consultant, as provided for in WAC 463-47-090(2)(b). To ensure objectivity and technical accuracy, EFSEC staff and EFSEC's consultant reviewed all Applicant-provided information and analyses before including them in the Draft EIS. EFSEC staff and EFSEC's consultant also extensively supplemented Applicant-provided information and analyses.

## 1 PURPOSE OF THIS ENVIRONMENTAL IMPACT STATEMENT

The purpose of the Draft EIS is to inform agencies, tribes, and the public about the environmental effects of the proposed Facility and the various measures identified by the Applicant, EFSEC staff, and EFSEC's independent consultant to minimize those impacts, and to solicit input on that information during the public comment period. Input received during the comment period is used to revise the document and prepare the Final EIS.

At the same time the Draft EIS is developed, EFSEC may begin adjudicative proceedings. EFSEC's adjudication is a formal hearing process similar to a courtroom trial. In the adjudication, EFSEC hears evidence presented by the parties to the adjudication, including the applicant, state agencies and local governments, and recognized intervenors such as tribes, interest groups, other local, state, or federal agencies, an assistant attorney general as counsel for the environment, and individuals with an interest not adequately represented by the other parties.

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1 An Application for Site Certification (ASC) is a formal submittal prepared by an applicant that provides EFSEC with information regarding the applicant, the proposed project design and features, the natural environment, and the built environment in sufficient detail to enable EFSEC to go forward with its application review. The ASC documents for this Project can be found on EFSEC's website:  
<http://www.efsec.wa.gov/Tesoro%20Savage/Application/Tesoro%20Savage%20Application%20Page.shtml>.

The Final EIS is used by EFSEC in conjunction with additional relevant information, including information gathered during the adjudication, to inform EFSEC's recommendation and the governor's final decision on an ASC. The information in the Final EIS can be used to condition the proposal to reduce impacts or to deny the proposal if significant adverse environmental impacts cannot be mitigated.

## **2 SUMMARY OF THE VANCOUVER ENERGY DISTRIBUTION TERMINAL PROJECT**

The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States<sup>2</sup> (Figure ES-1). The crude oil would be delivered to the proposed Facility by rail in "unit trains" composed of up to 120 sole-purpose crude oil tank cars, each with a tank car capacity of 750 bbl.<sup>3</sup> An average of four unit trains would arrive at the proposed Facility each day. Occasionally, a fifth train may arrive within a 24-hour period. A fifth train would begin unloading within that 24-hour period but would not complete unloading until the following 24-hour period. On other days (or subsequent days) only three trains may arrive within certain 24-hour periods, thus equating to an average of four train arrivals per day (Vancouver Energy 2015) for a total of 2,920 one-way train-trips (1,460 round trips) per year. Based on these assumptions, the maximum throughput of crude oil at the proposed Facility would be 131,400,000 bbl per year.

All tank cars used to transport crude oil to the proposed Facility would be required to meet the new US Department of Transportation (DOT) Specification 117 tank car standards jointly issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railway Administration (FRA) on May 1, 2015. These new standards require increased thickness of the tank shell, full height protection (head shields) at each end, improved protection for top fittings and discharge valves, and reconfigured tank vents for automatic reclosing to reduce vulnerability to breaching or failure during derailments (see Section 4.2.4.2 for details on DOT Specification 117 standards and retrofitting timeline for existing cars).

Once a loaded unit train arrives at the proposed Facility, the crude oil would be unloaded from the railcars and either pumped directly to marine vessels at modified berths on the Columbia River or pumped through a network of transfer pipelines to a storage area containing six aboveground storage tanks. During marine vessel loading, the crude oil would be transferred via pipeline and associated hoses to a modified existing marine terminal on the Columbia River. The marine vessels would then transit down the Columbia River and across open ocean to marine facilities capable of offloading the crude oil for delivery to receiving refineries.

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2 Receiving refineries could include those located in Alaska, Hawaii, California, and Washington.

3 The capacity of a single rail tank car is assumed to be 750 bbl, though actual carloads are limited by cargo weight, tank car weight, and vapor space requirements. In actual practice, each tank car often holds from 650 to 690 bbl of crude oil (Appendix E).



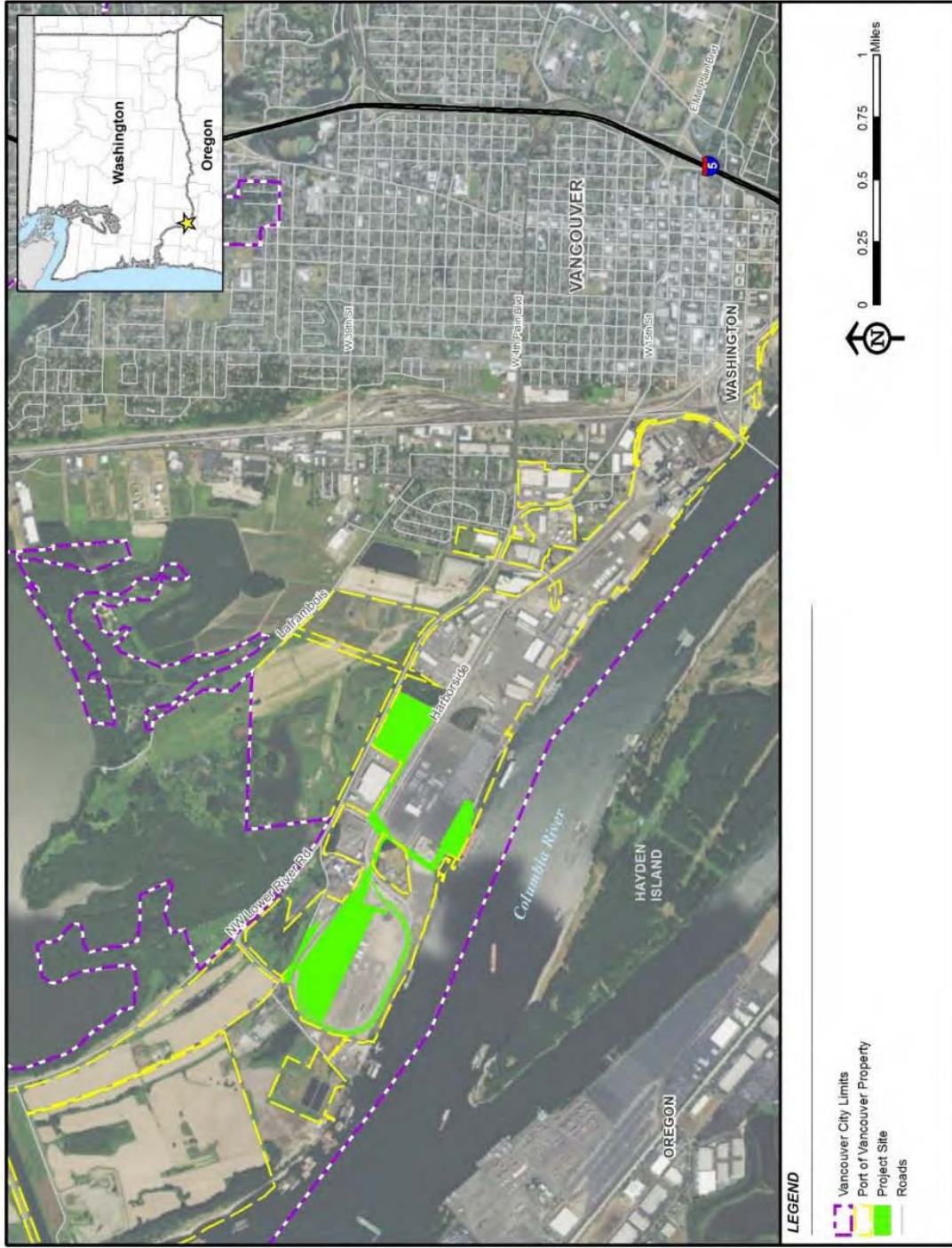


Figure ES-1. Vicinity Map of the Proposed Facility

### Executive Summary

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According to the Applicant, approximately 80 percent of the marine vessels expected to call at the proposed Facility would be in the 46 million deadweight tons (MDWT) size range. Smaller numbers of the marine vessels in the 105 and 165 MDWT size ranges (approximately 15 percent and 5 percent, respectively) may also call at the proposed Facility. Typical operations would involve the arrival, loading, and departure of one vessel in each 24-hour period, which equates to approximately 365 vessel calls per year. Each vessel call would involve two river transits—one inbound and one outbound. The Applicant has indicated that vessels would be allowed to depart the marine terminal only when conditions at the Columbia River bar allow departure to the open sea without having to anchor or loiter upriver from the bar. This requirement would likely result in an actual range of vessel calls of between 345 and 365 per year.

It should be noted that the Applicant (Tesoro Savage Petroleum Terminal LLC) would not source or own any crude oil, nor arrange for rail transportation of crude oil to the proposed Facility, or for marine vessel transportation of crude oil from the proposed Facility. Rather, the Applicant would receive its customers' crude oil by rail, unload and stage that crude oil in onsite tanks, and load the crude oil onto vessels provided by those customers. The Applicant has reported its customers would likely source crude oil primarily from mid-continent North American locations, including the Bakken formation that covers parts of North Dakota; Montana; and Saskatchewan, Canada. Depending on market conditions and the needs of the proposed Facility's customers, crude oil may also come from other North American formations, such as the Niobrara in Wyoming and Colorado and the Uinta in northeast Utah (Corpron and Makarow, pers. comm., 2015).

While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, it is assumed that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility. Because Burlington Northern Santa Fe (BNSF) owns or controls the rail infrastructure in the Bakken region, and rail transport agreements and rates tend to favor a single carrier, EFSEC has assumed that BNSF would be the likely rail transporter of crude oil from the Bakken to the proposed Facility. It is noted that currently four trains per day transport crude oil through Washington to receiving refineries using the same main rail lines that would be used by trains associated with the proposed Facility.

The proposed Facility would occupy several distinct but connected areas at Terminals 4 and 5 at the Port, along the northern bank of the Columbia River. The proposed Facility would occupy approximately 47.4 acres, consistent with the terms in the existing land lease agreement with the Port. The transfer pipelines that would convey crude oil between the unloading areas, storage tanks, and vessel loading area would be located in nonexclusive easements within the Port. The Applicant estimates that the total capital cost of the proposed Facility is approximately \$210 million, which includes both capital and construction costs.

### **3 PROJECT PURPOSE AND NEED**

The Applicant's stated purpose and need for the proposed Facility is to:

*...construct and operate a facility that would provide the service of trans-loading mid-continent North American crude oil to the West Coast to allow shipment of crude oil to refineries located primarily on the West Coast of North America. (BergerABAM 2014)*

### **4 ALTERNATIVES CONSIDERED**

Reasonable alternatives to the proposed Project and associated actions, including the No Action alternative (as required by SEPA) were identified and analyzed in the Draft EIS. The different types of

action alternatives considered during the development and evaluation of alternatives to the Proposed Action included alternative methods of transporting crude oil from mid-continent sources to West Coast refineries (including refineries in Alaska and Hawaii); alternative sites in Washington that could accommodate a similar project; and alternative onsite Facility configurations, operations, and component designs. As alternatives were identified, they were measured against the following criteria:

- Does the alternative feasibly attain or approximate the proposed Project’s objectives?
- Does the alternative provide a lower environmental cost or decreased level of environmental degradation than the proposed Project?

Each alternative was analyzed to determine whether the alternative met or failed to meet these criteria. An alternative that failed to meet either one of these criteria was eliminated from further consideration. A summary of the alternatives to the Proposed Action is presented in Table ES-1.

Table ES-1. Alternatives to the Proposed Project

Alternative Description	Alternative Evaluation
Delivery of Crude Oil by Tanker Trucks	Transportation of crude oil by tanker truck to the proposed Facility for subsequent shipment to West Coast refineries is a feasible alternative to the Proposed Action. However, this alternative would not provide a lower environmental cost or decreased level of environmental degradation than the Proposed Action due to increases in noise levels, air emissions (two-thirds greater greenhouse gas emissions), and reductions in transportation safety.
Delivery of Crude Oil to the Proposed Facility by Barge	This alternative would deliver crude oil to the Port by barge. It would exchange the transport of crude oil to the proposed Facility by rail for transport by barge for the 227 miles between Kennewick/Pasco and Vancouver. This alternative would require an increase in surface facilities at the Port by 38 acres, for a total of 83 acres of surface impact, and it would require construction and operation at two sites rather than one. A second unit train unloading, aggregation, storage, and loading process would need to occur at Kennewick. Therefore, it would not provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action.
Alternative Site Locations: Ferndale, Anacortes, Bellingham, Port Angeles, Everett, Seattle, Tacoma, Olympia, Grays Harbor, Kalama, Longview, Vancouver	Twelve ports were identified in Washington that could accommodate a facility similar to the proposed Facility: Ferndale, Anacortes, Bellingham, Port Angeles, Everett, Seattle, Tacoma, Olympia, Grays Harbor, Kalama, Longview, and Vancouver. These sites were evaluated based on initial siting criteria. Two sites met these initial criteria (Kalama and Longview) and were further evaluated based on site characteristics. Constructing a facility similar to the proposed Facility at the ports of Kalama or Longview could be feasible based on the initial siting criteria, but would likely result in greater impacts than the Proposed Action due to the need for filling wetlands at the Kalama site and the requirement for a new marine terminal at the Port of Longview. Rail capacity at both of these ports is also constrained. No alternative site locations were identified that would provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action.
Onsite Alternatives: Storage Tanks Site Alternative; Railcar Unloading Facility Alternative; Industrial/Sanitary Wastewater Discharge Alternative; Stormwater Treatment Alternative; Marine Terminal Alternative; Reduced Capacity Alternative	Alternative site layouts for required facilities, alternative facility elements, and alternative facility designs at the Port were evaluated. No alternatives that would result in a lower environmental cost or decreased level of environmental degradation were identified.  A reduced capacity alternative would not represent a lower environmental cost or decreased level of environmental degradation at the Port site compared to the Proposed Action because the same proposed Facility elements would be built at the site. A reduced capacity alternative would likely reduce the number of train deliveries to the proposed Facility with an associated decrease in impacts from train transportation. The probability of a major spill from trains would be decreased with a reduction in the number of trains, but considering that the probability of such an event is extremely low, further reduction would not represent a substantial difference from the Proposed Action.

Port = Port of Vancouver

The comprehensive review of alternatives did not identify any alternatives that were found to be reasonable alternatives to the Proposed Action. No alternatives were found to clearly show a lower environmental cost or decreased level of environmental degradation than the Proposed Action. The

alternatives carried forward for detailed analysis in this EIS were therefore the Proposed Action and the No Action Alternative.

### 4.1 The No Action Alternative

Under the No Action Alternative, the governor would deny the Applicant's request to construct and operate the proposed Project at the Port. Rail infrastructure improvements planned at the Port (i.e., the West Vancouver Freight Access [WVFA] project) would be completed as permitted. Under this alternative, the following scenarios could occur:

- **No development.** It is possible that no facility would be constructed during the 20-year timeframe for the proposed Facility, with no improvements to the site with the exception of continuation of current maintenance.
- **A different industrial facility.** With the completion of the WVFA project, the Port would likely seek other tenants to develop an industrial facility to use the existing unit train rail infrastructure and vessel berthing facilities at the marine terminal. Such a facility would likely be designed and operated to handle dry and/or liquid bulk commodities, but of unknown type or quantity. Based on current operations at the Port, these commodities could include grain, sand and gravel, lumber, metal, or petroleum products.

Under the No Action Alternative, the current demand by West Coast refineries for mid-continent North American crude oil would continue. This demand would require continued transport of crude oil by existing transportation modes (including pipelines, tanker trucks, and rail) from sources to refineries or from sources to new or expanded crude-by-rail terminals in other West Coast locations.

## 5 ENVIRONMENTAL RESOURCES/ISSUES ANALYZED IN THIS DRAFT EIS

SEPA requires analysis of impacts to various elements of the human and natural environment, but all categories may not pertain to all projects and additional resource topics may be included as appropriate. EFSEC identified environmental issues for analysis after reviewing comments received from the public, agencies, and other interested stakeholders during the scoping process and through additional agency coordination during development of the Draft EIS. The environmental resources analyzed in the Draft EIS are as follows:

- Earth Resources (including seismic hazards)
- Air Quality
- Water Resources
- Terrestrial Vegetation
- Terrestrial Wildlife
- Aquatic Species
- Energy and Natural Resources
- Environmental Health
- Historic and Cultural Resources
- Transportation
- Public Services and Utilities
- Noise
- Land and Shoreline Use
- Visual Resources
- Recreation

EFSEC has included analysis of the following issues in the Draft EIS to address specific concerns raised by members of the public, government agencies, tribal representatives, and other interested stakeholders during the SEPA scoping process<sup>4</sup>:

- Rail transportation impacts near the proposed Facility site, specifically including Vancouver and nearby communities.
- Greenhouse gases (GHGs) and other air emissions from proposed Project operations.
- Proposed Facility site emergency response capabilities, including hazmat response to incidents involving crude oil transported by railcar.
- Proposed Project impacts to socioeconomic resources including employment, tax revenue, and economic conditions.
- Rail transportation impacts to communities in Washington.
- Emergency response capabilities including hazmat response to incidents involving crude oil transported along the rail route within Washington.
- GHGs and other air emissions from rail and vessel traffic within Washington.
- Emergency response capabilities along cargo ship traffic lines on the Columbia River, from the proposed Facility site to the confluence with the Pacific Ocean.
- Cargo ship impacts from the proposed Facility site to the confluence with the Pacific Ocean.
- Qualitative analysis of rail transportation data along the rail route beyond the state boundary.
- Qualitative analysis of cargo ship transportation data beyond the state boundary.
- Qualitative analysis of proposed Project data related to crude oil extraction, refining and burning of fossil fuels, and their contribution to GHG emissions.

In addition to the evaluation of direct and indirect impacts to specific resources, an analysis of the cumulative effects of past, present, and reasonably foreseeable future actions was undertaken. This analysis considered other possible development projects at the Port as well as projects in the region that may contribute additional rail and vessel traffic to the systems that would be used by the proposed Project. The potential effects of other projects were added to the projected effects of the proposed Project to determine the magnitude and extent of cumulative effects.

## 6 POTENTIAL ENVIRONMENTAL IMPACTS

This Draft EIS describes the direct, indirect, and cumulative environmental impacts that could occur from construction, operation and maintenance, and eventual decommissioning of the proposed Facility, as well as from the transportation of crude oil to the proposed Facility by rail and from the proposed Facility to receiving refineries by vessel.

- **Direct impacts** are the effects of an action on a resource that occur at the same time and place as the action causing the impact.

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4 See <http://www.efsec.wa.gov/Tesoro%20Savage/20140403FinalSepaScope.pdf>.

- **Indirect impacts** are similar to direct impacts in that they are caused by the same action; however, they occur later in time or are farther removed in distance from the activity causing the impact.
- **Cumulative impacts** are impacts to the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

The environmental impacts in this Draft EIS are identified using the following four-level rating method to describe the magnitude, duration, and degree of potential impacts (Figure ES-2):

- **Negligible.** Impacts that are extremely low in intensity and often not measurable or observed.
- **Minor.** Impacts that are low in intensity, temporary, and local in extent, and do not affect unique/rare resources.
- **Moderate.** Impacts of moderate intensity independent of duration, with significant or unique resources potentially affected, on either a local or regional scale.
- **Major.** Impacts of high intensity and/or of long-term or permanent duration, of localized or regional extent, and/or that affect culturally important, ecologically important, or unique/rare resources.

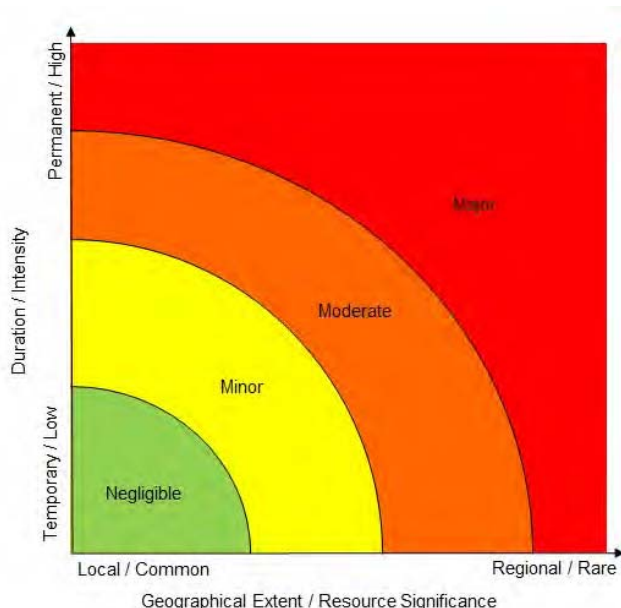


Figure ES-2. Schematic of Environmental Impact Ratings

### 6.1 Direct and Indirect Impacts

The following subsections provide an overview of the types of environmental impacts identified in this Draft EIS. These environmental impacts are also listed in summary Tables ES-2 and ES-3, located at the end of this chapter. The content and organization of the tables are discussed in more detail below.

Table ES-2 summarizes potential direct and indirect impacts to environmental resources from construction, operation and maintenance, and eventual decommissioning of the proposed Facility, as well as from transportation of crude oil to the proposed Facility by rail, and from the proposed Facility by vessel. Design features, best management practices (BMPs), and other actions proposed by the Applicant to avoid or minimize environmental impacts during construction, operations and maintenance, and decommissioning were assumed to be part of the Proposed Action and were taken into account when identifying the **Impacts** listed in Table ES-2. This table also lists additional **Mitigation Measures** identified by EFSEC to further reduce environmental impacts. Impacts that would remain moderate or major in magnitude, duration, or degree, even after all mitigation measures committed to by the Applicant or recommended by EFSEC have been applied are identified in Table ES-2 as **Significant Unavoidable Impacts**.

Table ES-3 summarizes impacts at the proposed Facility and along associated rail and vessel transportation routes from small to very large spill, fire, and explosion events. These impacts were identified assuming all measures intended to reduce impacts identified by the Applicant in the Preliminary Draft EIS and ASC would be fully implemented. Potential mitigation measures to address the risk of a crude oil spill, fire, and/or explosion at the proposed Facility and along associated rail and vessel transportation routes are presented in Section 4.8.

## 6.2 Cumulative Impacts

Cumulative impacts are the summation of impacts to a resource resulting from the incremental impact of an action (proposed action or alternative), including connected actions, when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes those actions. Section 5.1 of this EIS describes the methods undertaken and the reasonably foreseeable future actions identified for the cumulative impact analysis. Impact levels use the same rating method described above for direct and indirect impacts. Cumulative impacts that have been identified as moderate or major in this Draft EIS are briefly described below. The full discussion of cumulative impacts to resources is provided in Sections 5.2 through 5.19.

### 6.2.1 Proposed Facility

No significant (moderate to major) cumulative impacts were identified for the proposed Facility in combination with past, present, and reasonably foreseeable future actions.

### 6.2.2 Rail Transportation

According to the *Washington State Rail Plan* (Washington State Department of Transportation [WSDOT] 2014), the state's rail infrastructure has adequate capacity to meet current demands. However, the total number of trains that would be added to the system if all of the identified existing and future projects (Table 5-2) were to be permitted and operated is approximately 155 unit trains or 310 one-way train-trips per week. This amount would increase the overall use of rail facilities and would likely reach or exceed capacity in some areas.

In instances where demand approaches or exceeds capacity, a rail operator could implement various operational and/or physical improvements to minimize congestion on the rail network. Operational improvements include changing train scheduling and/or routing; physical improvements include measures to increase capacity such as additional sidings or segments of double-track. However, if adequate operational and/or physical improvements to minimize congestion are not implemented, the increase in rail transportation from trains associated with the Proposed Action in combination with existing and future foreseeable train traffic could have a moderate to major cumulative impact to rail transportation in

the future. Impacts include increased rail congestion, which could impact other users of the rail system, such as grain farmers, resulting in delays in moving their goods to market.

Cumulative increases in rail traffic would also likely increase gate downtimes and associated vehicular delays. Increases in gate downtimes would be worse during peak commuting times, particularly in urban areas, resulting in major cumulative impacts to transportation. In urban areas and during peak commuting periods, the number of highway vehicles idling while delayed at crossings could be substantial and result in minor to moderate localized increases in emissions. Rail traffic delay costs from congestion and increased gate downtimes are expected to be a moderate cumulative effect of increased trains associated with the Proposed Action in combination with existing and future foreseeable train traffic. Mitigation measures identified in Section 3.14.5 address these impacts.

Increased rail operations could contribute to increased volumes of leaks of small quantities of grease, oil, and fuel along the rail lines. Small spills and leaks would be expected to remain on the gravel railbed and potentially within adjacent soils, and could affect vegetation in close proximity to rail lines. Increased rail traffic associated with the Proposed Action in combination with existing and future foreseeable train traffic could also facilitate the rate at which noxious weeds are dispersed along the rail line. The increase in rail traffic with associated small spills and leaks and facilitated movements of noxious weeds and invasive plants could contribute to moderate, long-term cumulative impacts to vegetation communities along rail lines. The incremental increase in rail traffic associated with the Proposed Action, existing train traffic, and future foreseeable train traffic would also likely contribute to a moderate increase in wildlife collision mortality. Mitigation measures are identified in Section 3.5.5 to address this impact.

The additional rail traffic associated with the Proposed Action in combination with existing and foreseeable future actions could increase the rate of accidents and fatalities to pedestrian trespass or motorists at at-grade crossings along the rail corridor since a greater number of trains would mean a greater number of potential conflicts. As discussed in Section 3.8, some at-grade crossings along the rail corridor may currently have elevated safety risks that would increase with additional train traffic. Mitigation measures are identified in Section 3.8.5 to address this impact.

### **6.2.3 Vessel Transportation**

In the event that reasonably foreseeable future actions were to be permitted and operated, the total number of vessels that could be added to the Columbia River would be between approximately 2,610 and 3,948 vessel-trips per year.<sup>5</sup> When this amount is added to the 2013 total (approximately 1,457 vessel trips), between 4,067 and 5,405 deep-draft vessels per year could travel through the Columbia River. This amount would significantly exceed the recent historical high of 2,086 vessel trips that occurred in 2000.

A substantial increase in deep-draft vessels would likely result in increased wakes that could induce bank erosion, increase turbidity and cause localized water quality effects, and cause added degradation and destruction to some archaeological resources located along the shoreline. Cumulatively more vessel wakes could impact riparian vegetation directly through breakage, swamping, and erosion and indirectly through altered patterns of erosion and deposition and spread of aquatic invasive plants. Localized reductions of existing vegetation, prey, and overall essential fish habitat function could also occur from wakes during vessel transit. Increased occurrences of wake stranding<sup>6</sup> could also result from an increase

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<sup>5</sup> This includes the 365 vessels per year from the Proposed Action.

<sup>6</sup> Wake stranding is when aquatic species are lifted by a wave onto a shoreline and are stranded.



in deep-draft vessels along the Lower Columbia River below Vancouver and is an issue of ongoing active management concern (E2 Consulting Engineers, Inc. 2012).

Juvenile salmonids and other fish present in the vessel corridor are susceptible to wake stranding. Such wake effects would be limited to the lower approximately 33 miles of the river (16 percent) where shorelines with beaches close to the channel are not shielded from wave action and have beach slopes less than 10 percent. Wake effects would be the greatest as vessels pass through the Columbia River estuary and its associated habitats including tidal wetlands, shallow water, and tidal flats. The habitat types in these areas serve as important nursery grounds for juvenile fish and contain some of the highest quality, unarmored shallow-water shoreline habitat that is of great importance to numerous aquatic species and associated fisheries.

The cumulative increase in deep-draft vessel traffic and associated increase in vessel wakes could have a minor to moderate impact to soil erosion and water quality, moderate long-term impacts to shoreline vegetation and spread of invasive wetland and riparian plants, and moderate to major impacts to archaeological resources. Reduced vegetation communities in these areas could result in a moderate to major long-term change to vegetation resources, indirectly affecting fish species that rely on these habitats to complete their life cycle. Possible wake stranding effects to juvenile salmonids and other fish species would represent a moderate to major cumulative impact. Mitigation for wake effects to aquatic species has been identified in Section 3.6.5, which would also address potential impacts to soils, archaeological resources, water quality, and vegetation.

Underwater noise would be generated by vessels associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic as they transit through the Columbia River and the Pacific Ocean, which could disturb fish, marine mammals, or turtles. It is not likely that an increase in vessels transiting through the marine portion of the vessel corridor would add a significant level of noise due to the high volume of existing marine traffic and large area in which vessels can travel, but in the event that a significant increase in vessel traffic occurs within the confines of the Columbia River, noise levels from transiting vessels could increase ambient noise levels in this area, resulting in minor to moderate impacts to the species that reside there.

Entrainment of aquatic larvae and eggs would likely increase as a result of increased vessel numbers associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic transiting the Columbia River, which may result in a minor to moderate additional impact to the reproduction, population size, or distribution of fish species present in the vessel corridor.

An increase in vessel traffic associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic would likely require tribal fishing vessels to give way more often to larger cargo vessels, which may temporarily impede access to usual and accustomed (U&A) areas. Impacts to aquatic species from vessel wakes could reduce localized populations of important tribal fish species such as salmon, particularly during vulnerable times such as during extremely high temperatures. Cumulative impacts to U&A areas from vessels associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic could be moderate. Mitigation measures identified in Sections 3.6.5 and 3.12.5 would reduce these impacts.

Recreational watercraft users and fishing activities on the Columbia River in the vicinity of vessel operations could experience an increase in noise and visual impacts and would likely require recreational vessels to give way more often to such vessels, which could reduce the fishing experience for some users during narrow fishing seasons, resulting in minor to moderate impacts. Mitigation measures identified in Section 3.12.5 could help to reduce this impact.

## 7 SPECIAL STUDIES

Three special studies were commissioned by EFSEC to address concerns from the public during scoping and from EFSEC itself. These studies address:

- The potential for seismic and other geologic hazards (e.g., earthquakes, landslides) to impact the proposed Facility, unit trains, and vessels;
- The likelihood of train and vessel incidents (e.g., derailments, vessel groundings, collisions), the likely range of crude oil spill sizes that could result from these incidents, and the possible spread if a spill reached the water; and
- The current preparedness of Vancouver Fire Department (VFD) response personnel and equipment to respond to crude oil spills and fires at the proposed Facility and along the rail delivery route within the city of Vancouver.

These studies were carried out by individuals with extensive expertise in these areas. The study reports are all included as appendices to this Draft EIS.

### 7.1 Seismic Hazard Analysis

EFSEC commissioned an independent review of potential seismic hazards that could affect the proposed Facility and an assessment of the design of the proposed Facility, including ground improvements committed to by the Applicant to address seismically induced soil liquefaction (Appendix C). EFSEC's consultants also reviewed existing information in the public record to assess geologic hazards along the rail and vessel corridors. Section 3.1.2.4 provides a summary of the geologic hazards that could occur at the proposed Facility site and along the rail and vessel corridors.

#### 7.1.1 Proposed Facility

The Applicant's design would adhere to applicable industry seismic building codes and foundation design standards for all proposed Facility elements, including buildings, storage tanks, pipelines, and the marine terminal (see Section 3.1.3.4). Structures including buildings, storage tanks, and pipelines at the proposed Facility would be designed to minimize the risk of damage due to ground motion hazards from earthquakes. In addition to ground motion, geotechnical assessments of the proposed Facility location have concluded that soils in portions of the site could experience liquefaction<sup>7</sup> during an earthquake, and structures that may otherwise withstand ground movement could be damaged if underlying soils liquefied. EFSEC's independent seismic analysis confirmed that liquefaction was a concern given soil conditions underlying the proposed Facility site and determined the following:

- Ground improvement procedures would prevent damage to tank foundations in the event of an 8.9 magnitude earthquake at the storage area (Area 300).
- At the storage area (Area 300), no ground improvement is proposed for soils underlying the secondary containment berm. The stone columns under the foundations supporting the storage tanks do not extend to the berm. Therefore, the potential exists for liquefaction and ground deformation under the secondary containment berm. Designing the berm to withstand ground motion/shaking is appropriate, but needs to be combined with an assessment of potential

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7 Soil liquefaction describes a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid.

liquefaction beneath the berm, and the requirement to extend the ground improvements deeper into the ground.

- At the dock and adjacent transfer pipeline within the marine terminal (Area 400), the maximum considered earthquake (MCE) of 8.9 magnitude could result in 7 to 14 feet of lateral spreading at the dock and at the proposed transfer pipeline near the shoreline. Additionally:
  - Some of the vibroreplacement stone columns the Applicant proposes in this area may not reach stable foundation soils at depth based on existing geotechnical data.
  - Ground improvement consisting of deep soil mixed panels supported by jet grout columns does not have a well-established performance record.
  - Potential sliding of portions of the shoreline embankment south of and downslope from the system of proposed ground improvements is not mitigated by these improvements and, if this sliding occurs, it could deform the dock or displace a moored vessel.
- At the transfer pipelines (Area 500), near the shoreline at the southern end of the transfer pipeline, existing data indicate that the depth to stable nonliquefiable soils ranges from 33 to 51 feet below ground surface (bgs). The current ground improvement design includes stone columns with depths of between 5 and 16 feet bgs, which would not reach the underlying stable soils.

Given the potential for soil liquefaction from a large seismic event at the proposed Facility site, even with implementation of the Applicant's proposed ground improvements, impacts from these earthquake hazards could range from moderate to major. Additional mitigation measures were identified during the independent analysis that would, if implemented, reduce the range of impacts. These mitigation measures are described in Section 3.1.5.

### **7.1.2 Rail Corridor**

Seismic hazard impacts along the rail corridor could vary from negligible to moderate. The potential for seismic activity capable of disrupting rail transportation is particularly high in Washington. Impacts include possible train derailment associated with earthquake hazards. A detailed description of earthquake hazards along the rail corridor in Washington is provided in Appendix C.

Landslides pose a minor to moderate impact to rail transportation. The rail corridor would pass through various regions with steep slopes where landslides could occur. A landslide could result in a train car derailment if the active slide were to strike the train, or if slide debris covered or damaged the tracks and a train were unable to stop prior to impacting the debris. BNSF has identified locations where landslide susceptibility is high, and these sites are monitored by rail operators to reduce the potential for injuries and damage to rail equipment. In addition, slide fences, catchment walls, and widened ditches have been installed in known landslide areas to contain landslide debris and stabilize slopes, and they are routinely inspected and maintained to minimize impacts to railroad operations when landslides occur.

### **7.1.3 Vessel Corridor**

Seismic hazards along the vessel corridor occur near the Columbia River mouth and offshore along the marine transportation route. These hazards include tsunami and seiche waves generated by large earthquakes, particularly those associated with a subduction zone earthquake off the coast of Oregon or Washington. Impacts from these waves to vessels in the nearshore shallow-water environment could be major. Marine vessels on the open ocean are not likely to be impacted by earthquake-generated tsunami waves as these waves in the open ocean are typically less than a foot in height and pass under marine vessels unnoticed. As these waves approach shallow water, however, wave amplitudes increase substantially and the rise in seafloor topography causes the waves to increase in height. In the event of a

tsunami, a vessel could be inundated, grounded on the river bottom, pushed out of the navigation channel, or capsized from the wave. The probability of this type of incident is low, but it could have major impacts if it were to occur. The National Oceanic and Atmospheric Administration (NOAA) operates the Pacific Tsunami Warning System, which provides warnings for the Pacific Basin including the United States and other nations around the Pacific Rim. The warning system uses seismic data, tide gauges, and buoys to predict, detect, and issue warnings for seismic events. In the event of an earthquake capable of generating tsunamis, NOAA issues warnings to all potentially impacted vessels. Vessels in vulnerable nearshore environments would be encouraged to set a course for deeper water.

### 7.2 Crude Oil Spill Risk Assessments

Concerns were raised during scoping about possible crude oil spills related to operations at the proposed Facility, train derailments or vessel collisions. For the proposed Facility, the contingency planning spill volume consistent with WAC 173-182 for the storage tank area and contingency planning volumes estimated by the Applicant for four other elements of the proposed Facility are provided in Chapter 4 of this Draft EIS. These planning volumes would be used to finalize spill prevention, control and countermeasure plans, oil spill contingency plans, and a Facility Response Plan (before construction and operation of the proposed Facility occurred) unless the Washington State Department of Ecology (Ecology) determines that other volumes are more appropriate. An independent analysis of spill potential at the proposed Facility marine terminal during vessel loading was carried out using data gathered in previous studies involving transfer operations in Washington and California (Appendix E). In addition, EFSEC commissioned a lead consultant from Ecology's 2014 Marine and Rail Oil Transportation Study to conduct an independent analysis to address concerns related to the risk of crude oil spills from rail and vessel traffic associated with the proposed Facility (see Appendices E and J for the complete risk assessment reports). The independent analysis estimated the likelihood of rail and vessel incidents (derailments and vessel groundings, allisions, and collisions), the likely range of crude oil spill sizes that could result from these incidents, and the possible spread of oil in the event that a spill reached the Columbia River. These estimates have been used to assist in determining a range of possible spill scenarios for use in the resource-specific impact analysis. Examples of spill sizes are given here with additional information provided in Sections 4.3.2 (rail, Appendix E) and 4.3.3 (vessel, Appendix J). Results of the analyses include the following:

- The average number of years that would elapse between a derailment of one loaded car that results in a crude oil spill volume of 700 bbl or less is 27 years;
- The average number of years that would elapse between a vessel loading (transfer) spill of 1 bbl or less is approximately 14 years; and
- The average number of years that would elapse between a vessel grounding or collision resulting in a spill of 1,000 bbl is 34 years.

The proposed Facility, rail, and vessel safety considerations and accident prevention plans are designed to reduce the frequency of such incidents and to reduce the likelihood of a crude oil spill in the event of an incident (see Appendix D). Nonetheless, accidents could occur and the risk of a crude oil spill, fire, and/or explosion cannot be totally eliminated.

### 7.3 Emergency Response Preparedness

Concerns were raised during scoping about the potential for fires and explosions at the proposed Facility and/or during transportation of crude oil to and from the proposed Facility. EFSEC held discussions with the VFD during preparation of this Draft EIS to help determine the current preparedness of response personnel and equipment to respond to crude oil spills and fires at the proposed Facility and along the rail

delivery route within the city of Vancouver. The VFD identified the need for its staff to receive additional training on an annual basis in crude oil train derailment response, crude oil transshipment response at a marine terminal, industrial rescue, water response, industrial fire suppression, flammable liquids handling and fire suppression, and foam application in a live fire event. VFD further identified the need to fully identify and assess the risks involved in crude oil transportation and transshipment within the City and throughout their regional response area. VFD is concerned that the planning and training required to prepare for the development and operation of the proposed Facility could impact its ability to maintain its current service levels. VFD also stated that the need to attend training would create challenges in maintaining their regular minimum staffing and paying backfill and overtime for members to attend specialized training (Eldred 2015a, b).

Of the 34 fire departments/fire protection districts identified along the rail corridor in Washington and invited to participate in an EFSEC survey, 12 responded. Of the responding jurisdictions, the majority are volunteer agencies, where at least 75 percent of the agency's firefighters are unpaid members of the community. Only 1 out of the 12 fire agencies reported that its firefighters are trained and equipped to respond to a train derailment with resulting oil spill and fire. Three-quarters of fire agencies report having access to, either within their department/district or through mutual aid, personal protective equipment, aqueous film-forming (AFF) foam, and foam applicators. Only a quarter of responding jurisdictions reported having access to oil spill containment equipment (e.g., hard boom and/or sorbent boom).

All responding jurisdictions indicated that they can contact the owners of a crude oil unit train by dispatch or other method if an incident were to occur. However, only half of the responding fire agencies are aware of the location of the BNSF railroad equipment cache closest to their jurisdiction. The survey results show that most fire departments/districts have indicated they could use additional information to assist in response planning. In the EFSEC survey, each fire agency was asked whether it had sufficient personnel and equipment resources to respond to small, medium, large, and very large spill event scenarios and associated fire and/or explosion along the rail corridor that were used in the resource-specific impact analyses. All responding agencies indicated the need for additional resources to respond to one or more spill event scenarios, particularly the larger spill and associated fire and/or explosion scenarios. For all spill and/or associated fire scenarios, responding agencies most frequently cited the need for additional staffing to adequately respond to an incident and other calls for service within the community, closely followed by the need for additional logistical support.

The Maritime Fire Safety Association (MFSA) has developed and maintains a state-approved Vessel Response Plan that vessels can choose to adopt. It should be noted that the current MFSA spill contingency plan is not designed to address spills greater than 300,000 bbl, and is primarily focused on addressing spills of refined petroleum products rather than crude oil. Twelve fire agencies, including VFD, have an agreement with MFSA to provide one engine and three people for shipboard firefighting if the agency can provide these resources without impacting service within its jurisdiction. The fire suppression crew from VFD's Station 1 cross-staffs both the quick response vessel and Engine 1 (the fire engine for Station 1); therefore, Engine 1 is out of service while the quick response vessel is responding to a service call (Eldred 2015c).

## 8 POTENTIAL CRUDE OIL RELEASES

Potential crude oil spills related to operations at the proposed Facility and from train and vessel transportation are studied in the Draft EIS. Chapter 4 provides a discussion of safety considerations, accident prevention and response plans, and the actions that would be undertaken in the event of an accidental oil spill, fire, and/or explosion associated with the proposed Facility and the transportation of crude oil. Resource-specific impacts from such events are provided in Section 4.6.

## **8.1 Potential Crude Oil Releases and Associated Environmental Impacts**

The Draft EIS addresses the different types of crude oil that would potentially be transshipped through the proposed Facility and their physicochemical properties. According to the Applicant, Bakken crude oil and diluted bitumen (dilbit) would be the two most common crude oils transported to and from the proposed Facility. The potential impacts to environmental resources from spills at the proposed Facility and along associated train and vessel transportation corridors were considered for two scenarios: (1) small to medium spills and (2) large to very large spills (see Table 4-13 in Chapter 4 for details on spill volume scenarios). Impact analysis at the proposed Facility and along associated train and vessel transportation routes also considered potential small fires and large explosion and fire events.

The study area for the spill event impact analysis includes the proposed Facility, rail corridor, and vessel corridor. The rail corridor for this impact analysis also includes the Columbia River from Kennewick to 1 mile downstream of the Port. This rail-Columbia River corridor includes all adjoining side channels, sloughs, and associated wetlands, and adjacent riparian and upland habitats within 0.25 mile of the river shoreline. For each environmental resource studied in the Draft EIS, a discussion of potential impacts from accidental crude oil spills, fires, or explosions is provided, along with identification of particularly sensitive areas or resources that would experience greater impacts. The range of impacts considered for each resource includes the effects of the initial event and the effects of the likely response to that event, as summarized in Table ES-3. In general, the impacts to environmental resources would depend on the adequacy of response plans; the volume of crude oil spilled or extent of fire and/or explosion; the physical, temporal, and environmental factors affecting the event; and the level of response to the incident

## **8.2 Additional Mitigation Measures to Address the Risks of and Impacts from a Crude Oil Spill, Fire, and/or Explosion**

Industry standards and measures committed to by the Applicant to avoid and minimize the risk of a crude oil spill, fire, and/or explosion are presented in Section 4.1.3. Because EFSEC has made no final decisions regarding the adequacy of the current mitigation proposals from the Applicant, additional mitigation could be identified during the site certification process, permitting activities, or further environmental review. EFSEC has identified the following additional mitigation measures for consideration by the state legislature and other federal, state, and local agencies and private organizations to address the risk of and impacts from a crude oil spill, fire, and/or explosion.

### **8.2.1 Legislative Actions**

- Implement the recommendations on prevention-based mitigation of crude-by-rail risks, prevention-based mitigation of crude oil marine transportation risks, and prevention-based mitigation of crude oil terminal facility risks included in the 2014 Washington State Marine and Rail Oil Transportation Study.

### **8.2.2 Mitigation Measures for the Applicant to Implement**

- Provide secondary containment for aboveground crude oil transfer pipelines at the proposed Facility to reduce the risk of spills to the environment.
- Implement the mitigation measures identified in Section 3.1.5 to further reduce risks from seismically induced soil liquefaction.
- Require all tank cars used to transport crude oil to the proposed Facility to meet or exceed DOT-117 (or newer) specifications developed by PHMSA, FRA, or other appropriate regulatory authorities for the life of the Project.

- Coordinate with potentially affected first responder agencies and contribute support to implement a plan that would facilitate:
  - Training for full-time and voluntary first responders with jurisdiction along the delivery rail route in Washington and in the vicinity of the Port in the appropriate methods for combating volatile crude oil fires and explosions. Training should be modeled after or coordinated with similar training programs to be developed by the University of Findlay, the International Association of Fire Chiefs, and The Center for Rural Development (in cooperation with the Security and Emergency Response Training Center in Pueblo, Colorado) using Assistance for Local Emergency Response Training (ALERT) grants awarded by PHMSA.
  - Purchase of additional crude oil spill and crude oil fire and explosion response equipment to be stationed at appropriate locations along the delivery rail route and at the Port.
- Provide comprehensive instruction and training for VFD in the design, operation, and interaction with the proposed Facility's fire protection system. Additional specific training needs include annual training in crude oil transshipment response at a marine terminal, industrial rescue, water response, industrial fire suppression, flammable liquids handling and fire suppression, and foam application in a live fire event.
- Provide support for additional research, technology, and equipment for responding to spills of heavy crude, such as dilbit.
- Develop appropriate response strategies for cleaning up spills of heavy crude oil prior to transporting dilbit on the Columbia River.
- Contribute to all updates of the Lower Columbia River GRP and other applicable Northwest GRPs in partnership with Ecology, ODEQ, USCG, and EPA for the lifetime of the proposed Facility to address the type and amount of crude oil moving to and from the proposed Facility.
- Work with Ecology, ODEQ, and others to develop response strategies for environmentally sensitive areas on the Lower Columbia River and along the rail corridor within the state for inclusion in the Lower Columbia River GRP and reference in the Applicant's oil spill contingency plan.
- Retain a licensed engineer to perform an independent engineering analysis and feasibility study to improve oil recovery in the case of a spill during vessel loading at the dock. The study would determine the number of days it is safe and effective to preboom oil transfers and would identify site-specific improvements to maximize successful prebooming. The Applicant should submit this study to EFSEC. If improvements to allow for prebooming are determined to be unfeasible, the Applicant would be required to implement alternative measures including but not limited to the following measures to mitigate the absence of preventative boom in the water during transfers: stage an appropriate number of dedicated response vessels, deploy additional containment and cleanup equipment, and station trained personnel at the terminal dock and/or at a nearby staging area during oil transfers.
- Conduct a study to identify an appropriate level of financial responsibility for the potential costs for response and cleanup of oil spills, natural resource damages, and costs to state and affected counties and cities for their response actions to reduce the risks and impacts from an oil spill. The study should be conducted prior to commencing operations and address the factors in RCW 88.40.025, Evidence of Financial Responsibility for Onshore or Offshore Facilities, including a reasonable worst-case spill volume, the cost of cleaning up the spilled oil, the frequency of operations at the Facility, prevention measures employed by the Facility that could reduce impacts through spill containment, immediate discovery and shutoff times, and the damages that could result from the spill (including restoration). The study should identify any constraints

related to the commercial availability and affordability of financial responsibility. Based on the study, EFSEC shall determine the appropriate level of financial responsibility and require the Applicant to demonstrate their financial responsibility to the satisfaction of EFSEC. Proof of financial responsibility would be included as documentation in the Applicant's contingency plan.

**8.2.3 Mitigation Measures Involving EFSEC, the Applicant, and Other Agencies and/or Private Organizations**

- Ecology should verify that the appropriate regulatory contingency spill planning volume used to develop appropriate spill containment at the proposed Facility is “the entire volume of the largest aboveground storage tank on the facility site complicated by adverse weather conditions...” (the largest aboveground storage tank capacity at the proposed Facility is 375,000 bbl) or if “...a larger or smaller volume is more appropriate given a particular facility’s site characteristics and storage, production, and transfer capacity” (WAC 173-182).
- The Applicant should coordinate with EFSEC and the City of Vancouver to ensure that an independent technical review of the proposed Facility’s fire protection systems is conducted at the 100 percent (final) design stage, consistent with the recommendations in Appendix B.
- The MFSA, with assistance from the Applicant, should update the existing MFSA Vessel Response Plan to:
  - Address a Handymax regulatory worst-case discharge volume of 319,925 bbl (Appendix J, Table 3)
  - Expand the plan’s current focus on vessel shipments of refined petroleum products to include shipments of various types of crude oil on the Columbia River.
  - Mandate that all vessels loading at the proposed Facility adopt the MFSA Vessel Response Plan (Appendix D.11).
- The Applicant and EFSEC should coordinate with the USCG, Lower Columbia River Harbor Safety Committee, Ecology, ODEQ, Columbia River Bar Pilots, and Columbia River Pilots to ensure that existing safety procedures and vessel traffic management systems are adequate to accommodate 365 additional crude oil vessels per year, primarily of the Handymax vessel size. These procedures should address at minimum:
  - Safe speeds for laden tank vessels carrying crude oil and other vessels while in the traffic lane.
  - Appropriate capacities with regard for the Columbia River channel for laden tank vessels carrying crude oil.
  - Minimizing of vessel traffic and anchorage maneuvers during outbound transits.
- EFSEC should coordinate with Ecology, the Applicant, and vessel operators to revise Project-related vessel operation requirements based on the findings of Ecology’s upcoming Columbia River vessel traffic risk assessment, required by Engrossed Substitute House Bill 1449, as appropriate.
- EFSEC and the Applicant should communicate with Local Emergency Planning Committees (LEPCs) along the rail corridor and in the vicinity of the proposed Facility to determine or update the following information: LEPC contact information (phone, email, and website), county/cities included in the LEPC plans, date of last LEPC plan update, regularity of LEPC meetings, LEPC funding status, LEPC emergency response training status, and components of LEPC emergency plan including dangers and/or responses specifically affecting low-income or minority populations in the LEPC area.



- EFSEC and the Applicant should coordinate with the State Fire Defense Committee to update the Washington State Fire Services Resource Management Plan to ensure that the plan can facilitate provision of adequate mobilization of personnel trained to address crude oil spill, fire, and/or explosion incidents anywhere along the rail and vessel corridors and at the proposed Facility, and to ensure that the plan can facilitate provision of adequate mobilization of personal protective and response equipment for these incidents.
- EFSEC, the Applicant, and the rail transporter of crude oil should coordinate with the State Fire Defense Committee, LEPCs, and local emergency responders along the rail corridor to ensure development of specific evacuation plans for each residential community of greater than 50 residents within 0.25 mile of the rail route and within 1 mile of the proposed Project at the Port. This plan should include written instructions to all residents and emergency communication protocols for them to follow in the event of a crude oil spill, fire, or explosion event.

### **Crude Oil Transshipment Safety Considerations and Planning**

Several federal, state, and local regulations and industry engineering and safety standards apply to every aspect of a crude oil distribution system in recognition of the potential risks of crude oil releases. Accident and spill prevention planning occurs as an important element of regulatory implementation and industry safety standards. Applicable regulations and industry safety standards in effect as of July 2015 have been reviewed in the Draft EIS.

Current regulations provide for hazardous materials incident response planning and implementation procedures to minimize damage to human health and the environment in the event a crude oil spill does occur. A discussion of established response organizations; national, regional, and local response plans; and contingency and response plans drafted for the proposed Facility are provided in this Draft EIS (see Section 4.2) and considered in the assessment of potential environmental impacts in the event of an accidental crude oil release. Appendix D provides the Applicant plans referenced in this Draft EIS including construction and operations spill prevention plans, Facility Oil Handling Manual, and Operations Oil Spill Contingency Plan. An assessment of the capabilities and preparedness of emergency responders along the rail and vessel corridors and near the proposed Facility site was also carried out for consideration in assessing potential environmental impacts in the event of a crude oil release, and to provide information to decision makers.

## **9 ISSUES TO BE RESOLVED**

This Draft EIS analyzes a wide range of issues identified during scoping associated with the Proposed Action. Through the Draft EIS process, some of these issues have been found to require further consideration by the Applicant and decision makers, or require information that is not available during an EIS process (e.g., 100 percent design). The following issues will require the Applicant's and EFSEC's further consideration and/or additional information before being resolved:

- Confirm adequacy of the Applicant's proposed ground improvement program, including numerical modeling and a reassessment of the required depth of penetration of stone columns, and confirm that the design of the transfer pipelines (Area 500) has sufficient strength and flexibility to withstand earthquake-generated ground deformations that could impact the dock and moored vessels during seismic events (see Section 3.1.5).
- Determine the responsible entities for implementing proposed mitigation measures recommended to the governor by EFSEC in the event that an ASC is granted.

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- Confirm adequacy of the Applicant's proposed onsite fire protection systems in an independent assessment at the 100 percent design stage.
- Consult with potentially affected tribes to determine impacts to Reserved Treaty Rights for accessing U&A areas for hunting, fishing, and gathering.
- Determine the in-water work window in consultation with the Applicant, EFSEC, and the Washington Department of Fish and Wildlife (WDFW).
- Determine if mitigations identified in the Draft EIS to address seismic and safety upgrades and utility line work at the marine terminal are adequately considered in ongoing discussions between EFSEC and the US Army Corps of Engineers regarding the Applicant's application for a Department of the Army permit and the associated Environmental Assessment.
- Determine through further discussions between the Utilities and Transportation Commission (UTC) and BNSF if at-grade crossings along the rail corridor require modifications or upgrades to address safety and delay issues.

## 10 AREAS OF CONTROVERSY AND UNCERTAINTY

The proposed development of a crude oil terminal at the Port of Vancouver has been met with support and opposition from different stakeholders. Approximately 31,074 comments were received from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. These comments addressed numerous areas of controversy and uncertainty including issues such as climate change, national energy policy, the volatility of crude oils, and the risks of oil spills, fire and/or explosion at the project site or along rail or vessel transportation routes. Many of the comments focused on concerns over the safety and inherent risks associated with transportation of crude oil by rail. Additional comments pertained to possible health effects; geological hazards; response capabilities of police, fire and emergency medical services; and potential impacts to threatened and endangered species and tribal resources.

The assessment of potential impacts from the proposed Facility and associated rail and vessel transportation includes some level of uncertainty because it includes predictions of future events, some with very low probabilities of occurrence. The rail and vessel oil spill risk analyses (the full reports are provided in Appendices E and J respectively) use historical data to predict the likelihood of a future rail or vessel accident and potential resulting oil spill. These predictions used best available data and statistical analyses to estimate potential frequencies and volumes of oil spills. Because the frequency and severity of an actual spill, explosion, or fire in the future cannot be predicted, such analysis includes an unavoidable degree of uncertainty.

Similarly, the seismic risk analysis (Appendix C) used proposed Facility plans (including engineering drawings), site-specific test results, publicly available hazard data, and relevant information from published reports, maps, and websites to estimate the potential impact of a large seismic event at the proposed Facility and along rail and vessel transportation routes. Because the frequency and severity of future seismic events cannot be predicted, such analysis includes an unavoidable degree of uncertainty. One final area of uncertainty is the actual performance of new or retrofitted DOT Specification 117 tank cars and their ability to resist breaching or failure during derailments.

## 11 PUBLIC AND AGENCY INVOLVEMENT

EFSEC initiated a public involvement program, which included scoping and agency coordination, to assist with identification of impacts to be addressed in the EIS. Scoping is the first step in the SEPA

environmental review process and refers to the act of identifying issues and concerns related to a proposed project. The scoping period for this EIS was October 3 to December 18, 2013. Members of the public, government agencies, tribes, and other interested stakeholders were invited to attend two scoping meetings and to submit comments verbally or written on comment forms during scoping meetings or by email or surface mail. EFSEC received approximately 31,074 comments from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. These comments were reviewed by EFSEC in determining the scope of the EIS. The Scoping Report can be found at EFSEC's website.<sup>8</sup>

In addition to scoping, EFSEC invited agency representatives with regulatory authority or special expertise with respect to environmental issues to assist in development of the EIS. Representatives from the following agencies cooperated in developing this Draft EIS:

- WDFW,
- Ecology,
- WSDOT,
- Washington State Department of Archaeology and Historic Preservation (DAHP), and
- Washington UTC.

These agency representatives assisted in evaluating the ASC and Preliminary Draft EIS, participated in meetings with EFSEC staff and contractors during development of the Draft EIS to identify issues and mitigation, and participated in the review of preliminary working sections of the Draft EIS for accuracy and adequacy. EFSEC will continue to work with agency representatives in responding to comments, and these agencies would continue to provide special expertise with respect to environmental issues and regulatory authority during development of the Final EIS.

## 12 NEXT STEPS

Publication of the Draft EIS is an important element of the public involvement process. Public availability of the Draft EIS initiates a comment period, during which time members of the public, agencies, tribes, and other stakeholders are invited to review and provide comments on the Draft EIS. The public has been given 45 days to comment on the Draft EIS. Comments may be submitted verbally or in written form at one or both of the following scheduled public meetings:

***City of Vancouver:***

January 5, 2016, 1:00 p.m.  
until the last speaker

Clark County Event Center at the Fairgrounds  
Hall B  
17402 NE Delfel Road  
Ridgefield, WA 98642

***City of Spokane:***

January 7, 2016 5:00 p.m.  
until the last speaker

Centerplace Regional Event Center  
2426 N Discovery Place  
Spokane Valley, WA 99216

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<sup>8</sup> The Scoping Report is available at:  
[http://www.efsec.wa.gov/Tesoro%20Savage/Scoping%20Report/Final%20Draft%20Scoping%20Report%20\\_electronic\\_02-20-14.pdf](http://www.efsec.wa.gov/Tesoro%20Savage/Scoping%20Report/Final%20Draft%20Scoping%20Report%20_electronic_02-20-14.pdf).

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Comments may also be submitted online at: <http://www.efsec.wa.gov/Tesoro-Savage/SEPA - DEIS/DEIS PAGE.shtml>. All comments received during the comment period will be considered in preparing a Final EIS. EFSEC will prepare and issue a Final EIS, which will include a list of the comments received and the responses to those comments.

The Draft EIS has been made available for review and comment to all interested individuals, government agencies, tribal members, and members of nongovernmental organizations who have indicated an interest in the proposed Project. In addition, the Draft EIS has been posted to EFSEC's publicly accessible website: <http://www.efsec.wa.gov/Tesoro-Savage.shtml>.

EFSEC will maintain a mailing list throughout the public involvement process that includes attendees at public meetings, commenters during the scoping process, and individuals who have requested to be added to the mailing list. To be added to the mailing list, please contact Kali Wrspir at [kwraspir@utc.wa.gov](mailto:kwraspir@utc.wa.gov) or (360) 664-1365, or email your complete name and postal address to [efsec@utc.wa.gov](mailto:efsec@utc.wa.gov) and indicate whether you want to receive notices of future permitting activity for this project by email, surface mail, or both methods of delivery.

### 13 DECISIONS TO BE MADE

After its evaluation is complete, EFSEC will submit a recommendation to the governor. If EFSEC recommends approval of the proposed Facility, it will submit a draft Site Certification Agreement (SCA) for the governor's signature. An approved SCA typically includes a range of conditions that the Applicant must meet during project construction, operation, and eventual decommissioning. Within 60 days of receipt of EFSEC's recommendation, the governor may approve the Facility, reject the Facility, or direct EFSEC to reconsider the SCA. If an ASC is denied, a proposal cannot be constructed and operated.

### 14 FURTHER INFORMATION ABOUT THE PROJECT

EFSEC's publicly accessible website for the proposed Project includes documents regarding the ASC, scoping comments, public comments, land use, and adjudication. The website also contains applications for related permits, schedules, transcripts of meetings, and relevant correspondence from the Applicant, EFSEC, and other interested stakeholders on various aspects of the ASC review and EIS process and is regularly updated with such information.

For information or questions concerning this Project please contact:

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Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
<p>Earth Resources</p>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Negligible to minor impacts to soil during construction and decommissioning due to temporary increased risk of soil erosion.</li> <li>In the event of a massive earthquake, moderate to major unavoidable impacts could result from the liquefaction of susceptible soils underlying elements of the proposed Facility.</li> <li>In the event of a massive eruption, ashfall accumulation on proposed Facility elements could have a negligible to minor impact.</li> </ul> <p>Mitigation:</p> <p>EFSEC has identified the following additional mitigation measures to reduce impacts from construction methods and seismic hazards associated with the proposed ground improvements:</p> <ul style="list-style-type: none"> <li>Reassess the required depth of penetration of stone columns in the marine terminal (Area 400) and the western portion of the transfer pipelines (Area 500) near the Columbia River shoreline along the transfer pipeline and at the dock to secure the stone columns in either the nonliquefiable dense sand unit immediately overlying the Troutdale gravel or in the Troutdale gravel itself to greatly reduce the risk of damage during seismic ground motion/shaking. If the depth to the nonliquefiable dense sand unit is greater than the currently proposed depth, the installation depth should be increased accordingly. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible.</li> <li>Install stone column ground improvements beneath the entire secondary containment berm in the storage area (Area 300) to ensure berm stability in the event of earthquake-induced liquefaction. While the Applicant has committed to a seismic stability analysis of the berms in accordance with WAC requirements, they only require designing the</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Landslides pose a minor to moderate potential impact to rail transportation associated with the proposed Facility.</li> <li>In the rare circumstance in which a landslide-generated wave inundated rail tracks, impacts could be moderate.</li> <li>The impact of ashfall from a massive volcanic eruption could vary from negligible (a light dusting of ash) to moderate (burial of rail infrastructure under ash).</li> <li>The impact of lahars and/or debris flows could vary from negligible (light deposits of mud) to moderate (flooding/burial/damage of rail infrastructure from fast-moving, thick, muddy/rocky debris).</li> <li>A large earthquake could cause moderate to major impacts to rail transportation in areas where seismic ground motions induce soil liquefaction or slope instability.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No impacts identified for earth resources related to the rail corridor or rail operations.</li> <li>A large earthquake could cause moderate to major disruptions to rail transportation in areas along the rail corridor where seismic ground motions induce soil liquefaction or slope instability.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from a local, landslide-generated wave would likely be negligible to minor.</li> <li>In the event of a massive volcanic eruption, impacts from ashfall accumulation onto vessels could be moderate.</li> <li>Fault rupture in the vessel corridor region could result in moderate to major impacts from seismic water waves in the Lower Columbia River or along coastal marine routes, including the capsizing of marine vessels.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No impacts identified for earth resources related to the vessel corridor or vessel operations.</li> <li>In nearshore environments or near river mouths, such as the Lower Columbia River, impacts to vessels from tsunamis could range from moderate to major.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>containment structure to withstand seismic forces and constructing using sound engineering practice. Designing the berm to withstand ground motion/shaking is appropriate but needs to be combined with an assessment of potential liquefaction beneath the berm as well as the requirement to extend the ground improvements deeper into the ground. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible.</p> <ul style="list-style-type: none"> <li>• Conduct more thorough numerical modeling / analyses (e.g., FLAC, PLAXIS) of the ground improvement system in the marine terminal (Area 400) to verify the anticipated performance of the deep soil mix panels supported on top of the jet grout columns. The outcome of the modeling is expected to include revised numbers, dimensions, and geometry of ground improvement elements to demonstrate expected control of ground displacements and lower potential for pipeline damage. If the numerical modeling results do not verify the anticipated performance, redesign the ground improvement system to achieve the anticipated results.</li> <li>• Confirm that the design of the transfer pipelines (Area 500) has sufficient strength and flexibility to withstand earthquake-generated ground deformations that could impact the dock and moored vessels during seismic events. If existing evidence is unavailable or does not support the required strength and flexibility of the transfer pipeline, redesign these Project elements to achieve that result. Alternatively, extend ground improvements into the soil forming the sloping embankment beneath the dock structure. Any ground improvements or dock modifications occurring below the ordinary high water mark (OHWM) would require consultation with the US Army Corps of Engineers (USACE) and other relevant state agencies to assess potential impacts to terrestrial and aquatic species and habitats and water quality. Conduct in situ geotechnical testing (e.g., cone penetrometer tests</li> </ul>		

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>[CPT] or standard penetration tests [SPT]) during installation of ground improvements to ensure that the soils have been sufficiently improved to achieve expected reduction in liquefaction potential. If testing determines that the expected level of ground improvement has not been achieved, continue ground improvement activity until the expected level of improvement is achieved.</p> <ul style="list-style-type: none"> <li>Install sediment control barriers (silt fencing with filtration fabric keyed in at ground surface; possibly straw wattles) at the top of the embankment to prevent flow of silt-laden water from stone column installation from entering the Columbia River. Monitor water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved.</li> <li>Install monitoring wells downslope from the stone column and jet grout column installation areas to monitor water quality during installation of these improvements. In the event of unacceptably high pH levels and/or sulfate levels during ground improvements, install additional sheet pile barriers to prevent contaminated water from entering the Columbia River, or halt jet grouting until a modified approach with BMPs can be approved by EFSEC. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible to minor.</li> <li>Check for possible deformation of the ground surface along the river embankment, using survey measurements of surface markers, or more sophisticated instrumentation, as needed.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified to earth resources related to construction, normal operation</li> </ul>		

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Air Quality	<p>and maintenance, and decommissioning of the proposed Facility.</p> <ul style="list-style-type: none"> <li>If an MCE earthquake (or larger) were to occur along the Cascadia Subduction Zone (CSZ), moderate to major unavoidable impacts could result from the liquefaction of susceptible soils underlying elements of the proposed Facility.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Vehicles idling while delayed at at-grade crossings could increase emissions to a level that would represent an additional minor impact to local air quality.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified—a minor increase in rail traffic could be assumed to additionally represent a minor increase in air emissions in the vicinity of the rail corridor.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Increased vessel traffic and associated air emissions would have a minor impact to air quality.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified—increased vessel traffic and associated air emissions would have a minor impact to air quality.</li> </ul>



<p>Water Resources</p>	<p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• Impacts to water quality from small spills and leaks of hazardous materials would be minor.</li> <li>• Disturbance of the riverbed during temporary pile installation at the proposed marine terminal would cause minor to moderate temporary increases in turbidity of surface water.</li> <li>• Muddy groundwater or jet water brought to the surface and cement mixes that raise the pH and turbidity could enter the Columbia River in stormwater, resulting in minor to moderate impacts to groundwater and surface water.</li> <li>• Impacts to floodplains or impacts to proposed Facility activities from flood events would be minor.</li> <li>• Impacts to water resources from stormwater discharges from the proposed Facility would be minor.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• Install and maintain an erosion control barrier along the top of the Columbia River embankment for the areas adjacent to stone column installations consisting of silt fencing, filtration fabric, and straw wattles, or similar measures approved by EFSEC. Monitor the water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If the water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved.</li> <li>• Conduct monitoring of groundwater quality for pH and sulfate content during jet-grouting activities between the columns and the temporary sheet pile wall, in a geographic pattern and at appropriate depths, to determine the magnitude of any elevated levels and the potential for such contaminants to reach surface water under the sheet pile wall. In the event that monitoring revealed excessive pH or sulfate content, halt jet grouting until a modified approach with BMPs can be approved by EFSEC.</li> <li>• Monitor flood predictions, warnings, and the rate of floodwater rise, and in the event of a flood event, temporarily suspend operations at threatened proposed Facility elements prior to the flooding. In the</li> </ul>	<p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• Project-specific contribution to chronic, low-level sources of water quality impairment from rail transportation use would be minor.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p><b>Significant Unavoidable Impacts:</b></p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• The increase in deep-draft vessel traffic and associated increase in vessel wakes would have a minor to moderate impact to wetland vegetation, primarily in the Columbia River estuary.</li> <li>• The incremental impact from vessels associated with the proposed Facility would likely be minor, but possible water quality consequences of resuspended contaminants could be moderate.</li> <li>• Impacts to water quality from discharge of ballast water would be negligible.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p><b>Significant Unavoidable Impacts:</b></p> <ul style="list-style-type: none"> <li>• The increase in deep-draft vessel traffic and associated increase in vessel wakes could have a minor to moderate impact to wetland vegetation, primarily in the Columbia River estuary. While the incremental impact from vessels associated with the proposed Facility would likely be minor, vessel-induced resuspension of existing (legacy) contaminated bed sediments in the Lower Columbia River could cause moderate local effects that could violate water quality standards and beneficial uses; the location, timing, or duration of impact cannot be readily predicted.</li> </ul>
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Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Terrestrial Vegetation	<p>event of an expected site inundation, demobilize movable equipment such as railcars and motor vehicles and relocate above the 500-year floodplain to the extent possible. Secure static equipment that cannot be moved.</p> <ul style="list-style-type: none"> <li>Modify the design of the dock transformer pad, control room/E-house, and fire pump and foam building in the marine terminal (Area 400) to ensure that the floor of these structures is at least 2 feet above the base flood elevation.</li> <li>Install permanent measures to cap and/or seal areas with subsurface ground improvement columns during decommissioning to prevent surface water from infiltrating and conveying contaminants into areas where vertical columns could facilitate groundwater movement and migration of contaminants. Contain hydrocarbon residuals in existing pipelines during removal.</li> <li>Obtain copies of all well abandonment forms listed in Ecology's well log database for high-producing wells installed between 1940 and 1967 and associated with the former Alcoa facility to verify that the wells were abandoned during site remediation.</li> <li>In addition, EFSEC may include additional water quality mitigation measures during water quality permitting.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Incremental increase in rail traffic could contribute to moderate, long-term impacts to vegetation from incremental increases in contamination from small spills and in abundance and distribution of noxious and invasive weeds.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Incremental increase in deep-draft vessel traffic could contribute to moderate, long-term impacts to shoreline vegetation from wake-induced shoreline erosion and spread of invasive wetland and riparian plants.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>Mitigation:</p> <ul style="list-style-type: none"> <li>Complete a weed survey for the proposed Facility site, followed by eradication of any noxious weeds and invasive plants currently established at the site prior to initiation of construction to help prevent the spread of noxious weeds to nearby wetland mitigation and wildlife areas.</li> <li>Include in the Landscaping Plan for the Administrative and Support Buildings (Area 200) the use of native trees and planting trees in groups within the landscape to provide additional mitigation for the loss of trees onsite.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>The incremental increase in rail traffic from the proposed Facility could contribute to moderate, long-term impacts to vegetation from incremental increases in contamination from small spills and in abundance and distribution of noxious and invasive weeds.</li> </ul>	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>The incremental increase in deep-draft vessel traffic could contribute to moderate, long-term impacts to shoreline vegetation from wake-induced shoreline erosion and spread of invasive wetland and riparian plants.</li> </ul>
Terrestrial Wildlife	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts to wildlife from possible collisions with construction equipment and vehicles would be minor.</li> <li>Active bird nests could be lost when trees are cut and vegetation is cleared if they occur within trees or that is to be cleared.</li> <li>Impacts to total forest habitat from Facility construction would be minor.</li> <li>Noise disturbance impacts to wildlife would be minor.</li> <li>Impacts to wildlife from small spills and leaks would be minor.</li> <li>Impacts to wildlife from light and glare at the proposed Facility would be minor.</li> <li>Impacts to wildlife that are attracted to the containment berm around the storage area (Area 300) (during transit, for basking, or for refuge) would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Incremental increase in rail traffic could contribute to a minor to moderate increase in wildlife collision mortality.</li> <li>Incremental increases in rail traffic could contribute to minor to moderate long-term impacts to terrestrial wildlife from incremental increases in barrier effects.</li> <li>Impact levels of contaminants from small leaks and spills would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>BNSF should identify and monitor wildlife-train collision and barrier hotspots along the rail corridor to determine whether current and projected levels of traffic would result in levels of mortality or barrier effects that would jeopardize the status of local wildlife populations. If significant levels of collision mortality and barriers to wildlife movement are identified, suitable wildlife crossing structures and other measures, such as fencing should be considered as appropriate.</li> <li>BNSF should consult with WDFW and USFWS or a Technical Advisory Committee in designing approaches to identify and monitor hotspots, and</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts to wildlife, including waterfowl and seabirds, from vessel transportation related to the proposed Facility would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> <li>Use only marine terminal loading area spot lighting during loading operations.</li> <li>Finalize the Construction Wildlife Monitoring Plan in consultation with EFSEC and WDFW and implement all recommended measures to reduce impacts to wildlife, including development of final noise threshold levels, monitoring distances, and adaptive management actions.</li> <li>Measure noise levels during construction in Areas 200 (administrative and support buildings), 300 (storage area), and 400 (marine terminal) including impact pile driving and ground improvement installation. If measured noise levels at the established distances exceed the established threshold, perform adaptive management actions, which could include additional noise monitoring at the nearest sensitive resource, using noise dampening strategies for impact pile driving such as placing nylon or wood blocks between the pile and hammer, and using temporary sound barriers (e.g., containers, earthen berms, or stockpiled materials around the ground improvement area).</li> <li>Retain old wood pilings, or check wood pilings for cavities used by purple martins before removing. The removal of creosote-coated pilings that contain purple martin nest boxes or cavities used by martins should be coordinated closely with WDFW.</li> <li>Perform tree removal outside of the nesting season (February 15 to September 1) to avoid impacts to active nests of protected migratory birds. If trees are to be removed during the nesting season, complete a preconstruction nesting survey no more than 2 weeks prior to removal to ensure that no active nests are present. If active nests of protected migratory birds are found, suspend tree removal activities until after nests have hatched and young have fledged.</li> <li>Monitor the approximately 2.2 acres of landscape plantings for 2 years after planting and replace all trees that do not become successfully established.</li> </ul>	<p>identify suitable crossing structures and other measures.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>The incremental increase in Project-related rail traffic would likely contribute a minor to moderate increase in wildlife collision mortality, including to predators and scavengers that may be attracted to the rail corridor by the increased availability of carcasses from animals hit by trains.</li> <li>The incremental increases in Project-related rail traffic could contribute to minor to moderate long-term impacts to terrestrial wildlife from incremental increases in barrier effects and minor increases of small quantities of contaminants.</li> </ul>	

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> <li>Incorporate design features such as enclosing structures so that no horizontal top surfaces are accessible, screen openings to prevent access to enclosed spaces for roosting or nesting, and install spikes or wires to prevent perching to avoid attracting birds such as pigeons, gulls, and starlings at the proposed Facility.</li> <li>Include measures in the waste management plan to control and contain food waste, and educate workers on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>		
Aquatic Species	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Habitat effects, including to essential fish habitats (EFHs), associated with modification of the existing marine terminal structure would be minor.</li> <li>Impacts from an increase in lighting would be minor.</li> <li>Impacts to aquatic species from the small increase in turbidity would be localized and minor.</li> <li>Vessel operations at Berths 13 and 14 would have a minor impact to existing aquatic habitat in the area.</li> <li>The long-term impacts from overwater shading to fish would be minor.</li> <li>Impacts to aquatic species from small spills and leaks of petroleum products and lubricants would be minor.</li> <li>Potential for salinity changes during discharge of ballast water to affect fish and invertebrates in the area would be minor.</li> <li>Hydraulic scouring caused by vessel and tugboat maneuvering activities may cause a localized minor but long-term change in the benthic community.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Accumulation and transportation of caked-on grease on tracks and creosote discharge from old railroad ties could occur, but it is unlikely that the volumes of these materials would disperse outside of the immediate rail tracks and unlikely that they would enter waterways in sufficient quantities to cause adverse impacts to surface water and associated invertebrates, resulting in negligible impacts.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Small spills of fuels or lubricants would have a minor impact to aquatic habitat present in the vessel corridor.</li> <li>Additional vessel trips would increase the potential for entrainment and could result in a minor additional impact to fish.</li> <li>Impacts to aquatic species from turbidity associated with proposed Project-related vessel traffic would be minor.</li> <li>Impact of increase in low-frequency noise to fish, marine mammals, and turtles would be minor.</li> <li>Impacts to marine mammals and sea turtles from vessel disturbance or strikes would be negligible.</li> <li>Noise impacts to marine mammals and sea turtles would be minor.</li> <li>Impacts to invertebrates would be negligible.</li> <li>Increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect on nearshore fish in the lower 33-mile portion of the Columbia River.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>Impacts to fish and marine mammals from underwater noise generated from upland impact and vibratory pile-driving activities would be minor to moderate.</p> <p>Impacts to water quality from increased turbidity and hazardous material contamination are expected to be minor to moderate.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Install erosion control barriers (silt fencing with filtration fabric keyed in at ground surface; possibly straw wattles) during installation of ground improvements at the marine terminal at the top of the embankment to prevent flow of silt-laden water from stone column installation into the Columbia River.</li> <li>Install monitoring wells downslope from stone column and jet grout column installation areas to monitor water quality during the installation of ground improvements to detect high pH or high sulfate content water that could be generated during installation.</li> <li>Make immediate notification to the Washington Military Department's Emergency Management Division and to the WDFW Region 5 Habitat Program Manager if, at any time, as a result of Project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills).</li> <li>Revise the Marine Mammal Monitoring Plan (MMMP) to include two additional observers to assist in monitoring the 6-mile zone where marine mammals could be affected by in-water vibratory pile driving.</li> <li>Use only spot lighting in the marine terminal loading area during loading operations.</li> <li>In the event that a Site Certification Agreement (SCA) is granted for the proposed Facility, EFSEC would coordinate with appropriate agencies to review and revise the MMMP before construction begins to minimize impacts to marine mammals.</li> </ul>		<ul style="list-style-type: none"> <li>Increase in deep-draft vessel traffic and associated increase in vessel wakes could result in a moderate to major long-term change to tidal wetlands, shallow water, and tidal flats EFHs and thus the species that rely on these habitats as well as wake stranding of small or juvenile fish.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Develop mitigation for wake stranding and wake effect impacts in consultation with appropriate state and/or federal agencies. Examples might include addition of fine-scale beach features such as strategically placed logs or vegetation in susceptible areas to provide refugia from wakes for habitat types important to juvenile fish.</li> <li>Reduce vessel transit speeds in areas that are more susceptible to wake stranding of juvenile fish due to shoreline geomorphology (e.g., near Sauvie Island).</li> <li>Make immediate notification to the Washington Military Department's Emergency Management Division and to the WDFW Region 5 Habitat Program Manager if at any time as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills).</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>The increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect on nearshore fish including listed salmonids and eulachon species in the lower 33-mile portion (16%) of the Columbia River.</li> <li>The increase in deep-draft vessel traffic and associated increase in vessel wakes could reduce vegetation communities, resulting in a moderate to major long-term change to the resource, indirectly affecting fish species that rely on these habitats to complete their life cycle. The increase in deep-draft vessel traffic and associated increase in vessel wakes</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Energy and Natural Resources	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>Overall, noise impacts to aquatic species (fish and pinnipeds) from noise generated by pile driving would be temporary and moderate.</li> <li>Impacts to water quality from increased turbidity and hazardous material contamination during construction are expected to be minor to moderate.</li> </ul> <p>Impacts:</p> <ul style="list-style-type: none"> <li>Construction of the proposed Facility would have a negligible impact to local electricity supplies and regional supplies of gasoline and diesel fuel, natural gas, and construction materials.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Coordinate with NW Natural to perform a site-specific evaluation to determine the actual physical and financial aspects required for NW Natural to serve the proposed Facility.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Negligible impacts from small maintenance work, fuel required for locomotives, and existing utilities to power rail line signals and lights.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>could result in a moderate to major long-term change to tidal wetland, shallow water, and tidal flat EFHs.</p> <ul style="list-style-type: none"> <li>The approximately 223% increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect to nearshore fish in the lower 33-mile portion of the Columbia River.</li> </ul> <p>Impacts:</p> <ul style="list-style-type: none"> <li>The one vessel (two trips) per day associated with the proposed Facility would not likely impact the availability of bunker fuels in the region, resulting in negligible impacts.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>
Environmental Health	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts to occupational health and safety during construction of the proposed Facility would be minor.</li> <li>Impacts to onsite workers and the general public from releases of previously contaminated areas during construction of the proposed Facility would be minor.</li> <li>Impacts to workers and the public from exposure to hazardous materials would be minor.</li> <li>In the unlikely event of a boiler or steam pipeline explosion, environmental health impacts to workers would be moderate to major if persons are present in the event vicinity.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from accidents involving railroad employees or members of the public along the rail corridor currently occur, but the rail traffic generated by the proposed Facility would represent a small fraction of the overall number of trains using the entire rail system. Impacts to environmental health from rail transportation are expected to be minor for most crossings but may be moderate for crossings with existing elevated safety risks.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Further coordination should occur between EFSEC and BNSF, UJC, and affected local jurisdictions to determine if crossings along the rail corridor are protected at the appropriate level.</li> <li>Appropriate measures should be implemented to prevent pedestrian and vehicular accidents, incidents,</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from a collision could result in injuries or fatalities, which are considered to be moderate to major impacts.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from a vessel accident (e.g. collision) would depend on the unique circumstance of the event and may include, but would not necessarily result in, injuries or fatalities, which are considered to be moderate to major impacts.</li> </ul>

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Noise	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>In the unlikely event of a boiler or steam pipeline explosion, environmental health impacts to workers would be moderate to major if persons are present in the event vicinity.</li> </ul>	<p>injuries, and fatalities at passenger stations or at-grade crossings along the inbound rail route in consultation with EFSEC. Such measures include installing signs, signals, or other visual devices to warn of approaching trains; installing infrastructure at pedestrian and vehicular crossings to improve the safety of crossing railroad tracks; potential closures of at-grade crossings and/or grade separation, and installing fences to prohibit access to railroad tracks.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from a rail accident (e.g., collision) would depend on the unique circumstance of the event and may include, but would not necessarily result in, injuries or fatalities, which are considered to be moderate to major impacts.</li> </ul>	
	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Noise impacts during construction at the Tidewater Office Building would be moderate to major and temporary.</li> <li>Noise impacts at the JWC dormitories from pile driving and jet grouting would be moderate and temporary.</li> <li>Noise impacts to sensitive receptors from operation of the proposed Facility would be negligible to minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Develop and implement a Construction Communications Plan to inform the public and commercial operators of construction activities.</li> <li>Limit outdoor construction activity, including construction staging, to between 7:00 am and 8:00 pm, 7 days a week.</li> <li>House compressors and electric motors in metal-framed and -sided buildings with sound insulation designed into the wall thickness, as practicable.</li> <li>Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receptors.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Noise impacts from trains associated with the proposed Facility would be minor to receptors located along the rail lines.</li> <li>Vibration impacts from trains associated with the proposed Facility would be negligible to minor to receptors located along the rail lines.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Establish quiet zones where conditions allow and close or replace at-grade crossings with grade-separated crossings to eliminate the need to sound horns to provide a warning of the approaching train. However, only the FRA can grant a quiet zone (BNSF 2015).</li> <li>Reconstruct at-grade crossings to provide a grade separation between rail and vehicular traffic to eliminate noise from horns. See Section 3.14.5 for a discussion on mitigation for at-grade crossings.</li> <li>Use wayside horns at the intersection instead of the louder locomotive horn to substantially reduce noise. A wayside horn causes less noise impact by focusing the warning sound only on the area where it is needed, such as near residential areas.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts from vessel traffic to noise receptors present within and along the shoreline of the Columbia River would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>



Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> <li>Operate earth-moving equipment and site equipment on the construction lot as far away from vibration- and noise-sensitive sites as possible.</li> <li>Operate stationary construction equipment (e.g., air compressors, portable or backup generators) as far away from vibration- and noise-sensitive sites as possible.</li> <li>Combine noisy operations to occur over the same time period. The total noise level produced would not be substantially greater than the level produced if the operations were performed separately.</li> <li>Avoid use of an impact pile driver where possible in noise- and vibration-sensitive areas. Drilled piles or sonic or vibratory pile drivers are quieter and cause lower vibration levels where the geological conditions permit their use.</li> <li>Use specially quieted equipment such as quieted and enclosed air compressors and properly working mufflers on engines.</li> <li>Phase construction clearing, earth-moving, and ground-impacting operations so they do not occur in the same time period within the same vicinity. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.</li> <li>Effective barriers can break the line of sight between the noise source and the receiver and are most effective when they are closest to either the source or the receiver. If possible, acquire limited property rights for the construction of sound barriers at the receiver.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>Noise impacts at the Tidewater Office Building from construction and decommissioning of the proposed Facility are anticipated to be moderate to major and would exceed the regulatory limit for a commercial receiving property, but would be short term. Note, however, that commercial area is not considered a sensitive receptor for this study.</li> </ul>	<ul style="list-style-type: none"> <li>Use ballast on a guideway to reduce train noise 3 dB at grade and up to 5 dB on aerial structures.</li> <li>Install effective barriers to break the line of sight between the noise source and the receiver which are most effective when they are closest to either the source or the receiver. If possible, acquire limited property rights for the construction of sound barriers at the receiver.</li> <li>Specify equipment for grade-crossing signals that sets the level of the warning signal lower where ambient noise is lower, that minimizes the signal duration, and that minimizes signal noise in the direction of noise-sensitive receivers.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
<p>Land and Shoreline Use</p>	<p>• Noise impacts at the JWC from construction and decommissioning of proposed Facility elements are considered moderate but would be typical of a heavily industrialized area (as the JWC is located within an industrialized area classification). Noise impacts would exceed the regulatory limit for a residential receptor, but would be short term.</p> <p>Impacts:</p> <ul style="list-style-type: none"> <li>• The overall impact to land and shoreline use from the proposed Facility would be minor.</li> <li>• Impacts within the riparian management area and frequently flooded area would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Because no additional land would be acquired along the rail corridor for new or expanded rail facilities directly related to the proposed Facility, land use impacts would be negligible.</li> <li>• Minor impacts from the four trains per day that would serve the proposed Facility could affect existing land uses located along the rail corridor due to increased rail traffic and associated noise.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Negligible impacts since the navigation channel and adjacent land uses are not expected to change as a result of the shipping traffic associated with the proposed Facility.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>
<p>Visual Resources</p>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Minor visual impacts during construction from changes to the visual setting near the proposed Facility would result from the presence of construction workers, equipment, vehicles, lighting, and partially constructed structures.</li> <li>• The proposed Facility would create little contrast to the existing altered environment; therefore, the impacts to visual resources from the proposed Project would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Increase in the frequency and the length of time that viewers see rail traffic would be a minor impact.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Increase in the frequency and the length of time that viewers see vessel traffic would be a minor impact.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
<p>Recreation</p> <p>Impacts:</p> <ul style="list-style-type: none"> <li>Roadway traffic impacts due to proposed Project construction are not expected to create noticeable delays, resulting in minor impacts to access to nearby recreation areas.</li> <li>Construction noise impacts from impact pile driving to hunters and other recreationists at Shillapoo Wildlife Area – Vancouver Unit (closest to the proposed Facility) would be minor.</li> <li>Visual impacts to recreational resources within the proposed Facility study area during construction would be minor and temporary.</li> <li>Impact from changes in the quality of recreation due to odors or noise may be experienced by some recreationists and would be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Distribute the proposed schedule of construction activities to all potentially affected recreational sites within the proposed Facility study area, so recreationists are aware of construction-related disruptions and can schedule activities accordingly to avoid disruption.</li> <li>Schedule quiet times (breaks in impact driving construction activities) to occur during some periods that correspond to hunting seasons at Shillapoo Wildlife Area – Vancouver Unit and make hunters aware of these quiet times.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Delay experienced by visitors to recreation areas caused by at-grade crossings would be minor.</li> <li>Minor increase in air emissions to Class I Wilderness Areas close to the rail route (e.g., Glacier National Park) would result in minor impacts to recreationists using these areas.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Visual impacts to recreationists from additional vessels associated with the proposed Facility, including an increase in the frequency and length of time that viewers see vessel traffic, would be minor.</li> <li>Minor impacts from seasonal commercial / recreational fishing vessel conflicts are expected.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>Provide financial support for existing boater educational efforts being conducted by organizations such as USCG Auxiliary – Buoy 10 Task Force and the numerous sheriff department marine patrols along the vessel corridor to help avoid commercial vessel / recreational boat conflicts during peak fishing seasons.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts to Traditional Cultural Properties (TCPs) and historic resources inside and outside of Washington would be minor.</li> <li>Minor impacts may include a temporary halt to fishing by tribal members in the vicinity when vessels are moving through the area, which could lead to a minor reduction in a day's catch volume.</li> </ul>
<p>Historic and Cultural Resources</p> <p>Impacts:</p> <ul style="list-style-type: none"> <li>The proposed Facility study area has no known recorded archaeological resources, historic resources, so no impacts would occur.</li> <li>Potential impacts to U&amp;A areas may occur through reduced access to tribal fishing areas near the</li> </ul>			

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
<p>proposed Facility marine terminal, resulting in minor impacts.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>In the event of an unanticipated discovery during construction activities, the Cultural Resources Inadvertent Discovery Plan (Flint 2015) would be followed. The steps outlined in the plan serve to minimize damage to any inadvertently discovered archaeological resources during ground-disturbing activities, which may include small, deeply buried and/or widely dispersed historic or precontact cultural materials. Steps included in the plan outline applicable state laws and regulations, previous data collected, stop-work and notification protocols for inadvertently discovered archaeological resources and human remains, discovery protection measures, documentation by professional archaeologists, monitoring of operations and emergency response activities, and notification contact list.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Mitigation:</p> <ul style="list-style-type: none"> <li>EFSEC will work with Indian tribes to determine access points and travel routes to U&amp;A fishing grounds along the rail routes. This information will be used to assess whether unit train or vessel timing restrictions should be or could be implemented to reduce impacts to U&amp;A access points and travel routes during certain times of the year.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Mitigation:</p> <ul style="list-style-type: none"> <li>EFSEC will work with Indian tribes to determine access points and travel routes to U&amp;A fishing grounds along the vessel routes to and from the Port from the Washington-Idaho border to the mouth of the Columbia River. This information will be used to assess whether unit train or vessel timing restrictions should be or could be implemented to reduce impacts to U&amp;A access points and travel routes during certain times of the year.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	
<p>Transportation</p> <p>Impacts:</p> <ul style="list-style-type: none"> <li>Impacts to roadways are expected to be minor.</li> <li>During the relocation process of Terminal 5 racks, impacts to rail transportation would be negligible.</li> <li>During operation of the proposed Facility, the impact to rail transportation would be negligible.</li> <li>The use of Berth 13 is expected to result in minor impacts to vessel traffic in the vicinity of the marine terminal facility.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, resulting in moderate to major impacts.</li> <li>Impacts to motorists from delays at at-grade crossings resulting from rail transportation associated with the proposed Facility could be moderate to major.</li> <li>Approximately 26 existing state highway locations along inbound and outbound rail routes are operationally sensitive to increases in train traffic and would experience increases in rail traffic as a result of proposed Facility operation.</li> <li>New tank cars would be heavier than existing tank cars due to the added weight of safety features,</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>The projected future volume of vessel traffic is substantially below the capacity of the navigation system, and the impact is considered to be minor.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>No significant unavoidable impacts identified.</li> </ul>	

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>which could increase the rate of maintenance and repairs for rail tracks.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>BNSF, UTC, WSDOT, and affected local jurisdictions should coordinate to identify the need for, and feasibility of, constructing new grade-separated railroad crossings in areas along the proposed rail routes where excessive gate downtimes and vehicular delays are anticipated.</li> <li>UTC, WSDOT, and affected local jurisdictions should coordinate to evaluate railroad crossing locations that are considered by WSDOT to be operationally sensitive to increases in train traffic to identify appropriate mitigation measures, possibly including upgrading passive crossings to active safety crossings, rerouting high-traffic routes to use existing grade-separated crossings, adding U-turns to allow drivers to easily access alternate routes, and/or installing grade-separated crossings (bridge or underpass).</li> <li>Both of these studies should be modeled after and coordinated with the study to be undertaken by the Washington State Legislature's Joint Transportation Committee (JTC) to investigate road-rail conflicts in Washington cities.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>Rail transportation associated with the proposed Facility would result in incremental additional delay caused by gate downtime at 200 roadway-railroad at-grade crossings along the 445-mile Columbia River Alignment. The total duration of gate downtime delay caused by a single train at each crossing, including the time needed to raise and lower the gate, is just over 5 minutes. When accounting for all of the proposed trains, the combined gate downtime delay at each at-grade crossing would be between 21 and 41 minutes per vehicle each day if a single vehicle encountered all trains in the same day. This amount represents an increase of between 15% and 26%, as</li> </ul>	

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Public Services and Utilities	<p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• Fire or worker injury would result in minor impacts to emergency and fire protection services.</li> <li>• Impacts to security services from operation of the proposed Facility would likely be minor, and no impacts to police services are anticipated.</li> <li>• Impacts to communication utility infrastructure and service interruptions would be minor.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p><b>Significant Unavoidable Impacts:</b></p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>compared to existing gate downtime delay at at-grade rail crossings caused by existing rail traffic.</p> <ul style="list-style-type: none"> <li>• An increase in train traffic may cause some rail segments to approach or exceed capacity, particularly in areas of high freight movements. For these rail segments, similar impacts, including rail congestion, resulting in delays and/or queues may occur, resulting in moderate to major impacts to rail transportation. However, in the event that mitigation measures implemented to address rail congestion are effective, this level of impact could be reduced to minor or negligible levels.</li> </ul> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• Increase in vehicle delays at at-grade crossings would cause a major impact to emergency and public services.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• Encourage BNSF to make SECURETRAK (a real-time GIS tracking program for crude-by-rail trains for use by state and/or regional fusion centers) available to emergency response vehicles in areas with at-grade crossings along the proposed rail route in Washington. BNSF should provide grants to those jurisdictions that would require technology upgrades and training in order to effectively use SECURETRAK.</li> <li>• Investigate the need for and feasibility of constructing new grade-separated railroad crossings in cities along the proposed rail route to reduce impacts to emergency response times from increased train traffic and excessive gate downtimes. Such studies could be funded in part by BNSF as is currently being done for a mayor-appointed task force conducting a similar investigation in Edmonds, Washington (My Edmonds News 2015). Study participants should include BNSF, UTC, WSDOT, and affected local jurisdictions and emergency responders. See Section 3.14.5 for a discussion on mitigation for at-grade crossings. This study should be modeled after and</li> </ul>	<p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>• Vessels associated with the proposed Facility would result in no impacts to public services and utilities.</li> </ul> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p><b>Significant Unavoidable Impacts:</b></p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Socioeconomics	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Creation of approximately 320 jobs during construction and 91 jobs during operations.</li> <li>• It is expected that most employees would come from areas within a 1-hour drive of the proposed Facility, and housing impacts would therefore be negligible.</li> <li>• Tax revenue, sales and use tax, property tax, income tax, and other taxes would be generated in Washington and Oregon.</li> <li>• No disproportionate effects were identified for environmental justice populations.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>	<p>coordinated with the JTC study to investigate road-rail conflicts in Washington cities scheduled to be completed by December 1, 2016.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• Delays to emergency responders (including fire protection, emergency medical service, and police protection) could occur along the rail corridor from trains associated with the proposed Facility in areas with at-grade crossings when a train is passing. The additional four unit trains per day associated with the proposed Facility would increase gate downtime by between 15% and 26% along the Columbia River Alignment. This increase in vehicle delays could constitute a major impact to emergency responders.</li> </ul> <p>Impacts:</p> <ul style="list-style-type: none"> <li>• Incremental increase of four additional trains per day could reduce property value within a mile of the rail corridor by not greater than 1.5%, which is considered to be a minor impact.</li> <li>• The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, with some shipments experiencing delays, costing rail carriers and shippers a combined \$409.07 for each hour of train delay time accrued.</li> <li>• Increased delay at at-grade crossings is anticipated to create costs for personal and business travelers, which can be translated into an annualized economic cost of approximately \$220,660.</li> <li>• Increased gate downtime resulting from unit trains associated with the proposed Facility could have disproportionate effects on environmental justice populations in communities along the rail corridor study area.</li> </ul>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Employment and income effects for the vessel corridor would be negligible to minor.</li> <li>• No disproportionate effects were identified for environmental justice populations.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• No specific mitigation measures identified.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• No significant unavoidable impacts identified.</li> </ul>

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Coordinate with BNSF to schedule shipments to reduce congestion and delay for other trains using the Spokane to Pasco segment of the Columbia River Alignment to the extent possible.</li> <li>• Coordinate with BNSF to schedule rail shipments to avoid travel through populated areas during peak traffic times to the extent possible to reduce unequable burden to environmental justice populations.</li> </ul> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> <li>• The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, with some shipments experiencing delays.</li> <li>• Trains traveling to the proposed Facility would increase gate downtime delay at all roadway-railroad at-grade crossings resulting in costs for personal and business travelers.</li> <li>• Increased gate downtimes from increased train traffic associated with the proposed Facility would have moderate to major impacts for some minority and/or low-income populations within the rail corridor study area from motorist delays and delays in response times for emergency responders.</li> </ul>	

Notes:

- 1 The Notice of Construction permit is required for installation of a new source of air pollution or for modification of an existing source of air pollution.
- BMP = best management practice, BNSF = Burlington Northern Santa Fe, City = City of Vancouver, CPT = cone penetrometer tests, CSZ = Cascadia Subduction Zone, DPM = diesel particulate matter, Ecology = Washington State Department of Ecology, EFH = essential fish habitat, EFSEC = Energy Facility Site Evaluation Council, FRA = Federal Railroad Administration, GIS = geographic information system, JWC = Clark County Jail Work Center, LED = light emitting diode, MCE = maximum considered earthquake, MMMP = Marine Mammal Monitoring Plan, OHWM = ordinary high water mark, Port = Port of Vancouver, SPT = standard penetration tests, TCP = Traditional Cultural Property, U&A = usual and accustomed, USACE = US Army Corps of Engineers, USCG = US Coast Guard, USFWS = US Fish and Wildlife Service, UTC = Washington Utilities and Transportation Commission, WDFW = Washington Department of Fish and Wildlife, WSDOT = Washington State Department of Transportation



Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
Earth Resources	<ul style="list-style-type: none"> <li>No impacts to bedrock geology or soils from a small to large crude oil spill.</li> <li>Potential impacts to soils (e.g., contamination or disruption) from explosion debris would likely be negligible to minor.</li> </ul>	<ul style="list-style-type: none"> <li>A small to large crude oil spill would likely have a negligible to minor impact to bedrock geology.</li> <li>Potential impacts to soils from a crude oil spill could range from minor to moderate; remediation requiring excavation could result in minor impacts to local topography.</li> <li>A fire or explosion inside a hard rock tunnel or near a hard rock outcrop could cause rock to fragment, creating a minor to major impact depending on the structural integrity of the bedrock.</li> </ul>	<ul style="list-style-type: none"> <li>A crude oil spill could coat some shoreline bedrock and contaminate shoreline soils and sediments resulting in minor, moderate, or major impacts depending on spill size. If remediation is required, contaminated shoreline soils could be excavated and removed or treated in place, leading to moderate additional impacts.</li> <li>Potential impacts to earth resources from a crude oil fire or explosion would likely be minor.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Impacts from small to medium spills at the proposed Facility would likely be minor. Impacts to air quality from a large spill could be moderate due to the volume of air pollutants released to the atmosphere.</li> <li>Impacts from a small fire at the proposed Facility could be minor to moderate. Impacts from a large explosion and fire would likely be moderate to major due to the volume of air pollutants released to the atmosphere.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts from spills, fires, and/or explosions along the rail route would likely be similar to those listed for the proposed Facility.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts from spills, fires, and/or explosions along the vessel route would likely be similar to those listed for the proposed Facility.</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>Impacts from small to large spills on surface water could be minor to major depending on the location of the spill and the presence or absence of secondary containment.</li> <li>Impacts from small to large spills on groundwater would likely be minor to major depending on the location of the spill and the presence or absence of secondary containment, the presence of preferential contaminant migration pathways (e.g., in areas where permeable stone columns are installed), and the presence or absence of subsurface impermeable barriers (e.g., sheet pile wall).</li> <li>A small to medium crude oil spill could produce minor impacts to Port water supply wells and other local wells if contamination migrates vertically into a portion of the unconfined Troutdale Aquifer System (TAS).</li> <li>Groundwater contamination resulting from a large spill could produce moderate to major impacts to</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to surface water from small to very large spills along the inland portions of the rail corridor would likely be moderate to major where spills could occur immediately over or adjacent to surface water features. Spills along portions of the rail corridor adjacent to the Columbia River could produce moderate to major surface water quality impacts.</li> <li>Impacts to groundwater quality from small to medium spills along the inland portions of the rail corridor would likely be minor to moderate in areas with GRP response strategies (along the Spokane and mid-Columbia rivers). Impacts from large to very large spills would likely be moderate since larger volume spills would have greater spatial spread and temporal persistence.</li> <li>A crude oil spill near any unconfined aquifer could, if not completely cleaned up, allow contaminant migration into the unconfined aquifer and produce</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to surface water quality along the Columbia River could extend up to 2 river miles (RMs) for a small to medium vessel spill event and to or beyond the mouth of the Columbia River for a large to very large vessel spill event.</li> <li>Depending on the location and duration of the spill event, impacts from a small to medium spill would likely be minor to moderate; impacts from a large to very large spill could be major.</li> <li>A crude oil vessel spill at the mouth of the Columbia River or along the open-ocean portion of the vessel corridor could also impact surface water quality in the marine and estuarine environments, as well as along affected shorelines depending on the type and volume of crude oil spilled, the spill location, water temperature, waves/currents, weather conditions, and the timing and effectiveness of initial response.</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<p>Port water supply wells and other local wells if unconfined aquifer contamination or surface water contamination migrates vertically into a portion of the unconfined TWS.</p> <ul style="list-style-type: none"> <li>• A large crude oil spill that reaches the Columbia River could impact water intakes located within 7 RMs downstream of the proposed Facility.</li> <li>• A large spill, particularly from the rail unloading transfer pipeline, could spread to existing wetlands located less than 1,000 feet away, including the wetland mitigation bank. This could produce moderate to major impacts.</li> <li>• Wetlands or floodplains along the Columbia River channel less than 1 RM downstream could experience minor impacts from a small to medium spill. Columbia River channel wetlands or floodplains within 7 RMs downstream could experience moderate to major impacts in the event of a large spill.</li> <li>• Impacts to water resources from a large explosion and fire event could be moderate to major depending on the spread of the fire and the size of the explosion debris field.</li> </ul>	<p>moderate to major localized impacts to drinking water quality.</p> <ul style="list-style-type: none"> <li>• Impacts to surface water supplies from small to very large spills along the inland portions of the rail corridor could be negligible to major depending on the location and duration of the spill.</li> <li>• Impacts to surface water supplies along the mid-Columbia River portions of the rail corridor could be negligible to major depending on location and persistence of spill-related contamination.</li> <li>• Impacts to wetlands and floodplains from large to very large spills would likely be moderate to major depending on the location and duration of the spill event and response activities.</li> <li>• Impacts to water resources from fire and explosion events would likely be minor to major depending on the spread of the fire and the size of the explosion debris field.</li> </ul>	<ul style="list-style-type: none"> <li>• Depending on the location and duration of a spill event, impacts from a small to medium spill would likely be minor to moderate, and impacts from a large to very large spill could be major.</li> <li>• A vessel crude oil spill along the lower Columbia River could pose a risk to groundwater in the unconfined alluvium along the main river channel and tributary confluence, with impacts from a small to medium spill likely to be minor to moderate, and impacts from a large to very large spill likely to be moderate.</li> <li>• Impacts to surface water and groundwater supplies along the Lower Columbia River vessel corridor from small to very large spills would likely be moderate to major depending on the number of water intakes and wells affected, resulting interruptions of water diversions and/or well pumping, and the persistence of water quality degradation.</li> <li>• Impacts to wetlands and floodplains along the vessel corridor from small to very large spills could be minor to major depending on location and persistence of spill-related contamination.</li> <li>• Impacts to water resources from a small fire event along the vessel corridor would likely be minor assuming that it is quickly controlled. Impacts to water resources from a large explosion and fire event along the vessel corridor could be moderate to major depending on the size of the fire and the extent of the explosion debris field.</li> </ul>
Terrestrial Vegetation	<ul style="list-style-type: none"> <li>• Impacts from small to medium spills would likely be negligible to minor because most spills would be contained and would not be likely to reach vegetated areas.</li> <li>• Impacts from a large spill could be moderate because these spills and the associated response actions could reach and damage vegetation in surrounding areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts from small to medium spills along the rail corridor would likely be negligible to minor because in most cases spills on land would not migrate extensively outside the immediate developed rail corridor, limiting exposure of sensitive vegetation communities.</li> <li>• Impacts from large to very large spills would likely range from moderate to major because a potential exists for spills to produce both short-term and long-</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts from small to medium spills along the vessel corridor would likely be minor assuming these spills would be contained within a limited area and would not reach sensitive vegetation communities.</li> <li>• Impacts from large to very large spills would likely be moderate to major since the spill could spread extensively and affect special-status plants and</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<ul style="list-style-type: none"> <li>Impacts from a large explosion and fire event would likely be moderate if the event and associated response activities extended into vegetated areas.</li> </ul>	<p>term effects on special-status plants and sensitive vegetation communities.</p> <ul style="list-style-type: none"> <li>Impacts from a small ground fire or surface fire would likely be negligible to minor assuming the fire could be controlled. The impacts to the most common vegetation covers would likely be short term.</li> <li>Impacts from a large explosion and fire event could range from moderate to major, especially if the fire extends into forest and woodlands including special-status plants and sensitive vegetation.</li> </ul>	<p>sensitive vegetation communities, resulting in short- and long-term effects on vegetation communities.</p> <ul style="list-style-type: none"> <li>A large fire and/or explosion could damage or destroy some shoreline vegetation if the event occurred near shore, producing minor impacts.</li> </ul>
Terrestrial Wildlife	<ul style="list-style-type: none"> <li>Impacts from small to medium spills would likely range from negligible to minor assuming the spills are contained within the proposed Facility, although any small to medium spill that reaches the Columbia River could produce moderate localized impacts to terrestrial wildlife and wildlife habitat up to 1 RM downstream.</li> <li>Impacts from a large spill could produce moderate to major impacts depending on the volume and location of the release, the season in which the release occurs, and whether the spilled oil migrates outside of the proposed Facility site.</li> <li>Impacts from a large explosion and fire event would likely be minor to moderate depending on the size of the explosion, extent of the fire, and the season in which the event occurred.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts from small to medium spills would likely range from negligible to minor assuming the spills are quickly contained and do not spread beyond the immediate rail bed, although any small to medium spill that reaches the Columbia River could migrate 1 RM downstream and produce moderate localized impacts to terrestrial wildlife and habitat, including priority habitats.</li> <li>Impacts from large to very large spills could produce moderate to major impacts depending on the volume and location of the release, the season in which the release occurs, and whether the spilled oil migrates into priority habitats, such as Wildlife Management Areas.</li> <li>Impacts from a small fire event along the rail corridor would likely be negligible to minor because the event would likely be contained, and effects to wildlife and wildlife habitats would likely be short-term.</li> <li>Impacts from a large explosion and fire event could be moderate to major because the event and associated response activities may damage special-status wildlife and priority wildlife habitats and could result in long-term effects on wildlife habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts from small to medium spills along the vessel corridor could be minor to moderate if spills make contact with wildlife and wildlife habitats up to 2 RMs from the spill source.</li> <li>Impacts from large to very large spills could be moderate to major as numerous special-status wildlife and priority wildlife habitats could be affected from the spill source to beyond the mouth of the Columbia River.</li> <li>A large fire and/or explosion along the vessel corridor could damage or destroy some terrestrial wildlife habitat if the event occurred near shore, producing minor impacts.</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Aquatic Species</p>	<ul style="list-style-type: none"> <li>Impacts from small to medium spills at the proposed Facility that reached the Columbia River would likely be minor assuming the spill is contained within secondary containment booms. If a small to medium spill escaped secondary containment it could impact aquatic habitats within 1 RM downstream of the proposed Facility.</li> <li>Impacts from a large spill could be moderate to major depending on the location of the spill and on the volume of oil, if any, that escaped containment systems. An uncontained large spill from the proposed Facility could impact aquatic habitats within 7 RMs downstream of the proposed Facility.</li> <li>Impacts from small to medium spills to the aquatic environment could be minor to moderate if the spilled oil were to reach the Columbia River.</li> <li>Impacts to aquatic species from a large spill could be moderate to major in the event that the spilled oil reached the Columbia River and spread to aquatic habitats up to 7 RMs downstream from the proposed Facility.</li> <li>Impacts to aquatic species from a large explosion and fire event would likely be minor to moderate as debris could enter the Columbia River and cause short-term, localized degradation of water quality (e.g., water temperature and quality) and species injury or disturbance.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to aquatic species from small to medium spills along the rail corridor would likely be minor to moderate depending on the location of the spill. If a spill occurred near a waterbody, aquatic habitats could experience degradation and aquatic species could be adversely affected.</li> <li>Impacts to aquatic species from large to very large spills could be moderate to major, with widespread and long-lasting effects depending on the amount of oil that entered the aquatic ecosystem.</li> <li>Impacts to aquatic species from a small fire event would likely be minor due to the limited area affected, unless the fire were to occur adjacent to a pristine stream that is fish bearing and is functioning as spawning or rearing habitat at the time of the event.</li> <li>Impacts to aquatic species from a large rail explosion and fire event could be moderate to major, depending on the location of the event.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to aquatic habitats and aquatic species from small to medium spills along the vessel corridor would likely be moderate to major, and impacts to aquatic habitats from large to very large spills would likely be major. In both cases, the level of impact would depend on the location, quantity, extent, duration, and timing of the spill event.</li> <li>Impacts to aquatic species from a large explosion and fire event could be minor to moderate depending on species presence, noise, and ejected debris.</li> </ul>
<p>Energy and Natural Resources</p>	<ul style="list-style-type: none"> <li>If response to an oil spill required excavation activities or temporary shutdown of electric power, negligible to minor impacts to local energy supply could occur.</li> <li>A large explosion or fire could result in substantial damage to onsite crude oil storage and transfer infrastructure, potentially leading to minor to moderate short-term reduction in the total amount of oil destined for refineries on the West Coast.</li> <li>A large fire and/or explosion could produce substantial damage to onsite energy infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to natural resources from a crude oil spill along the rail corridor would likely be minor, depending on the location, extent, and response activities. Nearby power lines could be damaged or destroyed during a derailment resulting in minor energy impacts from short-term interruptions in electricity supply.</li> <li>Impacts to energy and natural resources resulting from a large fire and/or explosion could be minor to moderate depending on the location of the event and the spread of the fire.</li> </ul>	<ul style="list-style-type: none"> <li>A large to very large crude oil spill from a vessel could result in a minor to moderate short-term impact to the refinery or refineries that would have received the crude oil.</li> <li>A small crude oil fire within the vessel corridor would likely have negligible to minor impacts to energy and natural resources.</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Environmentally Health</p>	<p>potentially leading to temporary shutdowns of natural gas pipelines and some local electrical power supply, resulting in moderate, short-term impacts to energy and natural resources.</p> <ul style="list-style-type: none"> <li>Impacts from a large crude oil spill would likely be minor if the spill were contained onsite.</li> <li>If a large spill migrated outside of the proposed Facility boundary, impacts could be minor to moderate since other persons could be affected in the release area, short-term dermal exposures to crude oil could occur, and the VFD currently considers itself undertrained and under-equipped to address a crude oil spill response.</li> <li>In the event of a large fire and/or explosion at the proposed Facility, workers or members of the public could be at risk of injury or death; the impacts would be major. The extent of risk would depend on the unique circumstances of the event, including the spread of fire and the severity of the explosion.</li> </ul>	<ul style="list-style-type: none"> <li>Delays in emergency response along the rail corridor caused by a derailed or stopped unit train blocking access could result in major impacts to human health, especially if evacuation or time-sensitive emergency response is required.</li> <li>Impacts from a small to medium crude oil spill along the rail corridor would likely be negligible to minor, except for incidents that led to direct injury or fatality.</li> <li>Impacts from a large to very large crude oil spill along the rail corridor would likely be negligible to moderate, depending on the location and extent of the spill, with greater impact in more heavily populated areas.</li> <li>In the event of a crude oil fire or explosion along the rail transportation corridor, train operators and the general public in the vicinity of the accident could be at risk of injury or fatality from blast wind, heat, burns, smoke, and fumes; the impacts would be major.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts from a small crude oil spill from a vessel would likely be minor assuming the spill was contained within a small area.</li> <li>If a large to very large spill from a vessel occurred, impacts could be moderate to major depending on the location and duration of the incident.</li> <li>If a small fire results in severe injury, fatality, or chronic illness from harmful levels of exposure, the impacts would be major.</li> <li>Impacts to human health, particularly the health of the vessel crew, from a large fire and/or explosion could result in severe injury, fatality, or chronic illness; the impacts would be major.</li> </ul>
<p>Noise</p>	<ul style="list-style-type: none"> <li>Noise from small to very large crude oil spills would be associated with emergency response efforts and equipment (e.g., trucks, helicopters, response vessels) and would result in negligible to moderate short-term increases in noise levels depending on receptor sensitivity and distance from the noise source.</li> <li>Noise impacts from a large fire would likely be minor; however, impacts from an explosion event at the proposed Facility could be moderate to major depending on the size of the explosion and the severity of auditory injuries.</li> </ul>	<ul style="list-style-type: none"> <li>Noise impacts from small to very large spills along the rail corridor would likely be short-term and negligible, although the sounds associated with a derailment could produce minor, temporary impacts to noise receptors in the immediate vicinity.</li> <li>Noise impacts associated with a large fire and/or explosion along the rail corridor would likely be similar to those addressed for a large fire and/or explosion at the proposed Facility and could range from minor to major depending on size and number of explosions and distance from the blast.</li> </ul>	<ul style="list-style-type: none"> <li>Noise impacts from a large fire and/or explosion along the vessel corridor would likely be similar to those described for a large fire and/or explosion along the rail corridor: short-term and negligible.</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Land and Shoreline Use</p>	<ul style="list-style-type: none"> <li>Impacts to land and shoreline use from a large spill at the proposed Facility would likely be minor to moderate depending on duration and season of occurrence.</li> <li>Impacts from a large fire and/or explosion would likely be minor to moderate, and short-term (until completion of response and restoration efforts).</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to land and shoreline use (temporary loss of use, damage) from a small to medium spill along the rail corridor would likely be short-term and minor to moderate depending on the location and timing of the incident.</li> <li>Impacts to land and shoreline use from a large to very large spill along the rail corridor would likely be moderate to major depending on the size, location, timing of the incident, and the length of time required to restore previous land and shoreline uses (if possible).</li> <li>Impacts to land and shoreline uses from a small fire along the rail corridor would likely be negligible to minor, depending on the location and duration of the fire.</li> <li>Impacts to land and shoreline use from a large fire and/or explosion along the rail corridor could be moderate to major depending on the location of the event, extent of the fire, and the size of the explosion.</li> </ul>	<ul style="list-style-type: none"> <li>A small to medium crude oil spill along the vessel corridor could produce minor to moderate impacts to land and shoreline uses up to 2 RMs downstream from the source, depending on duration of the incident and season of occurrence.</li> <li>Impacts to land and shoreline uses from a large to very large spill along the vessel corridor could be moderate to major depending on the location and duration of the spill and response efforts, the timing of the spill, and the specific land and shoreline uses impacted.</li> <li>Impacts to land and shoreline use from a large fire and/or explosion in the vessel corridor could be moderate to major if the event occurred close to shore, leading to damage or destruction of nearby shoreline facilities and short-term disruption of land and shoreline uses.</li> </ul>
<p>Visual Resources</p>	<ul style="list-style-type: none"> <li>A large to very large spill at the proposed Facility site requiring longer duration response activities and more personnel and equipment would likely produce minor visual impacts due to the potential to be observed only from more distant sensitive visual resources.</li> <li>A major fire and/or explosion at the proposed Facility would likely produce short-term moderate to major visual impacts, including flames, smoke, and destroyed property, that could be observed a considerable distance from the site.</li> </ul>	<ul style="list-style-type: none"> <li>Visual impacts from large to very large oil spills along the rail corridor, including visible oil slick, sheen, or pool and oiling of vegetation, buildings, and/or structures, could be moderate to major depending on the location relative to sensitive viewsheds.</li> <li>A large fire and/or explosion along the rail corridor could produce moderate to major visual impacts from smoke and flames depending on the location and extent of the fire and/or explosion and duration of the event and cleanup response.</li> </ul>	<ul style="list-style-type: none"> <li>Visual impacts of small to medium spills from observable oil slicks or sheens on water surfaces, oiling of vegetation or sediment along shorelines and adjacent floodplains and wetlands, and oiling of structures along the vessel corridor could be minor to moderate depending on the number of sensitive receptors in the spill area and depending on the presence of nearby important visual resources.</li> <li>Visual impacts from large to very large oil spills could be moderate to major depending on the spread of the oil slick or sheen and the extent of damage to natural areas, parks, or significant/historically important buildings and structures requiring an extended cleanup and restoration process.</li> <li>Impacts to visual resources from a large fire and/or explosion would likely be similar to those described in the rail corridor, including major visual impacts from smoke, flames, and possible damage to natural</li> </ul>

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Recreation</p> <ul style="list-style-type: none"> <li>Impacts to recreation sites and activities from a small to medium crude oil spill that enters the Columbia River could be minor to moderate and include loss of access to recreation areas and reduction in the real and/or perceived value of the recreational resource (e.g., loss of recreational fish, real or perceived reduction in recreational fish value, damage to swimming water quality).</li> <li>Impacts to recreation from a large crude oil spill at the proposed Facility would likely range from moderate to major for up to 7 RMs downstream of the proposed Facility. Oil response activities would likely cause moderate impacts for the duration of the response activities. Longer-term impacts to hunting and sport fishing could occur if a crude oil spill reduced local populations of wildlife, waterfowl, or fish.</li> <li>Impacts from fire and/or explosions could result in heat, smoke, ejected debris, noise, blast force, and disruption that deters or prevents use of nearby trails and recreation areas and would likely range from moderate to major, depending on the duration and extent of the fire and/or explosion.</li> </ul>	<ul style="list-style-type: none"> <li>The impact of a small to very large crude oil spill and associated response efforts to recreational sites and activities along the rail corridor would likely be similar to those described for spills at the proposed Facility, and could be minor to major.</li> <li>A small fire and response along the rail corridor could deter recreationists and damage buildings and facilities in recreation areas, resulting in minor to major impacts depending on the sensitivity and recreational value of the area damaged.</li> <li>A large fire and/or explosion and associated response efforts would likely produce similar minor to major impacts and could also lead to more extensive damage from ejected debris, noise, and blast force or larger and faster-spreading fires.</li> </ul>	<p>areas, parks, or significant buildings and structures, depending on the location and extent of the fire and/or explosion and duration of the event and cleanup response.</p> <ul style="list-style-type: none"> <li>The impacts to recreational sites and activities from a small to very large crude oil spill and associated response efforts along the vessel corridor would likely be similar to those described for spills at the proposed Facility and along the rail corridor and could be minor to major depending on the location, size, and timing of the spill and response activities, as well as the types of recreation areas/uses affected.</li> <li>Impacts to recreational sites and activities from a small fire affecting only the vessel would likely produce negligible impacts to recreation. However, if the fire occurred near the shore, nearby shoreline recreational sites and uses could be impacted, and impacts could range from minor to major depending on the sensitivity and recreational value of the resource(s) damaged.</li> <li>Impacts from a large fire and/or explosion event along the vessel corridor would likely be similar to those from an event at the proposed Facility or along the rail corridor and could range from moderate to major, depending on the sensitivity and recreational value of the resource(s) affected.</li> </ul>	
<p>Historic and Cultural Resources</p> <ul style="list-style-type: none"> <li>If a spill of any size at the proposed Facility reached the Columbia River, the spilled crude oil could produce minor to major impacts to submerged and shoreline archaeological resources 1 to 7 RMs downstream.</li> <li>Impacts of a spill of any size that reached the Columbia River could include oil contamination of fish and shellfish, and damages to fisheries that could have a moderate to major impact to cultural, traditional, and economic uses of fish for many tribes, depending on the extent and duration of the crude oil spill and response event.</li> </ul>	<ul style="list-style-type: none"> <li>A crude oil spill of any size and associated cleanup activities could impact important tribal lands and fishing and hunting areas within and adjacent to the rail corridor and in the Columbia River if the spill were to enter the river, resulting in moderate to major impacts.</li> <li>A large fire and/or explosion could have moderate to major impacts to historic and cultural resources depending on the location, extent of fire, and force of explosion.</li> <li>If a large fire and/or explosion were to occur near important tribal lands and fishing and hunting areas,</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to submerged and shoreline historic and cultural resources from a small to medium crude oil spill along the vessel corridor would likely be similar to those described for a spill from the proposed Facility.</li> <li>Impacts to submerged and shoreline historic and cultural resources from a large to very large crude oil spill along the vessel corridor would likely be similar to those described for a spill from the proposed Facility that reached the Columbia River, and could occur from the source of the spill to the mouth of the Columbia River.</li> </ul>	

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<ul style="list-style-type: none"> <li>A large fire and/or explosion that affected areas beyond the proposed Facility site could have minor to major impacts to surrounding archaeological and historic resources and important tribal lands and fishing and hunting areas depending on the amount of physical damage and/or destruction.</li> </ul>	<p>moderate to major impacts to tribal culture, tribal community subsistence harvest, and tribal treaty rights could occur.</p>	<ul style="list-style-type: none"> <li>If a large fire and/or explosion event occurred close to shore, impacts to nearby historic and cultural resources would likely be similar to those described for a large fire and/or explosion along the rail corridor.</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>A small to medium spill could require temporary closure of onsite roadways and rail loops at the Port causing short-term, minor impacts to other Port tenants that use the affected roadways and rail loops.</li> <li>A large to very large spill would likely impact onsite roadways and rail loops at the proposed Facility and may require full or partial closure of Lower River Road (SR 501) resulting in temporary detours and/or delays to vehicular and rail traffic and increased congestion on the roadway and rail networks.</li> <li>A large to very large spill that reached the Columbia River could result in closures to the Columbia River navigation channel that would delay or disrupt vessel traffic in both directions for the duration of the spill and response effort, resulting in minor to moderate impacts.</li> <li>A small crude oil fire at the proposed Facility would likely have similar impacts to transportation as a small to medium crude oil spill at the proposed Facility.</li> <li>A large fire and/or explosion at the proposed Facility could damage onsite transportation infrastructure (roads, railways), and ejected debris could also damage nearby offsite transportation infrastructure (such as SR 501) resulting in reduction in roadway and rail capacity and the diversion of vehicle and rail trips to other routes, which would constitute a moderate transportation impact until the infrastructure were cleared or repaired.</li> </ul>	<p>moderate to major impacts to tribal culture, tribal community subsistence harvest, and tribal treaty rights could occur.</p> <ul style="list-style-type: none"> <li>A derailment and associated small to medium crude oil spill along the rail corridor could temporarily disrupt rail traffic and impact at-grade roadway crossings and parallel roadways, resulting in short-term, negligible to minor impacts.</li> <li>A large to very large crude oil spill along the rail corridor involving the derailment of many railcars could result in longer closures of the rail corridor, and could cause damage that leads to the closure of nearby transportation infrastructure including bridges and highways. Impacts would likely be minor to major, depending on the extent and duration of damage to the transportation system.</li> <li>If a large to very large spill were to reach the Columbia River, the impacts would likely be similar to those described for a similarly sized spill at the proposed Facility.</li> <li>A small fire along the rail corridor would likely be associated with, and likely produce similar impacts as, a small to medium spill along the rail corridor.</li> <li>A large fire and/or explosion along the rail corridor would require closure of the rail corridor and nearby roadways, and potentially cause closure of nearby waterways. A large fire and/or explosion along the rail corridor could also damage bridges, tunnels, and nearby vessel infrastructure (piers and berths) that could lead to lengthy closures and transportation disruptions, resulting in moderate to major impacts depending on the location, spread of fire, size and force of the explosion, and duration of the response and repair efforts.</li> </ul>	<ul style="list-style-type: none"> <li>The impacts of a small to medium crude oil spill along the vessel corridor would likely be similar to those from a small to medium spill at the proposed Facility that reached the Columbia River.</li> <li>Impacts from a large to very large crude oil spill along the vessel corridor could include temporary closure of marine terminal facilities, anchorages, and/or portions of the navigation channel for the duration of emergency response and cleanup operations. These closures could increase river traffic congestion and congestion outside the mouth of the Columbia River, resulting in short-term, moderate to major impacts to vessel traffic for the duration of response efforts.</li> <li>A small crude oil fire along the vessel corridor would likely have minor, temporary impacts to vessel traffic in the vicinity of the event, depending on the distance of the burning vessel from shoreline infrastructure and nearby vessels.</li> <li>A large fire and/or explosion along the vessel corridor would result in severe damage to and grounding or sinking of the vessel, and a requirement for salvage to clear the navigation channel during or after response efforts. A large fire and/or explosion could also damage nearby vessels and shoreline or in-river infrastructure (e.g., marine terminal facilities, anchorages) and cause closures of portions of the navigation channel during emergency response operations, resulting in short-term, moderate to major impacts to vessel traffic for the duration of response efforts.</li> </ul>



Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Public Services and Utilities</p> <ul style="list-style-type: none"> <li>• A small to medium crude oil spill at the proposed Facility would require response by the VFD but would likely not require large numbers of personnel, resulting in minor impacts to VFD's capacity to address other emergencies in their jurisdiction.</li> <li>• A large to very large spill could cause delays in the provision of emergency medical services and fire protection to other parts of VFD's service territory resulting in moderate impacts.</li> <li>• Small fires that remain within the proposed Facility site could have minor to moderate impacts to VFD's capability to provide services in the event of other emergencies requiring response.</li> <li>• A large fire and/or explosion could place a high demand on VFD's resources, requiring multiple engines, trucks, and special response equipment, supporting rope rescue, hazardous materials response, and marine fire response that could result in moderate to major impacts to VFD's ability to provide fire protection to other parts of VFD's service territory.</li> <li>• A large fire and/or explosion event could also cause human injury and a high demand for emergency medical response and police services that could result in moderate to major impacts to these service providers.</li> </ul>	<ul style="list-style-type: none"> <li>• A small to medium crude oil spill along the rail corridor could result in minor to major impacts to fire and police services depending on the location of the spill and the available resources of the responding service agencies and the railroad operator (BNSF).</li> <li>• A large to very large crude oil spill could strain fire agencies beyond current personnel, training, and equipment levels and preclude appropriate response to other calls for service within their service area resulting in major impacts.</li> <li>• A small fire along the rail corridor could have a minor to moderate impact to public services and utilities as fire departments, police departments, and medical personnel work to control the fire, protect public safety, and treat any injuries while also providing service to other areas and individuals.</li> <li>• A large fire and/or explosion along the rail corridor could require extensive response, resulting in moderate to major impacts to public services and utilities depending on the location, extent of the fire, force of the explosion, potential for additional fire and/or explosions, need for evacuation, and number of injuries requiring medical services.</li> <li>• If the local fire agency's resources are engaged in an extended response operation, delays to fire protection and emergency medical response for other needs in the service area could occur, resulting in major temporary service impacts. Similarly, if local police are required to coordinate an evacuation and maintain a restricted area, delays in response to other needs in the service area could occur, resulting in major temporary service impacts.</li> <li>• If a train derailment occurred in an area that restricted or delayed access to other areas potentially requiring fire, police, or medical services, moderate to major temporary impacts to service provision could occur in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Because most fire agencies (including VFD) have agreements with the MFSA that limit their equipment and personnel commitments for shipboard firefighting, most fire agencies could provide these resources with negligible impacts to their ability to respond to other calls for service within their jurisdiction.</li> <li>• Depending on the level of need for emergency medical services resulting from a large fire and/or explosion along the vessel corridor, the impact to emergency medical services could be minor to major.</li> <li>• Depending upon the location and size of the area affected, along with the level of risk to human safety, impacts to police and security services could be negligible to moderate.</li> </ul>	

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Socioeconomics</p> <ul style="list-style-type: none"> <li>• If a large crude oil spill at the proposed Facility escaped secondary containment and extended beyond the site boundary, some evacuation and relocation of nearby populations could be necessary. This could produce minor, short-term impacts to nearby population and housing.</li> <li>• A crude oil spill of any size from the proposed Facility that reached the Columbia River could have adverse impacts to employment and income of fishermen if fishing in the vicinity were temporarily restricted. A temporary (a few hours to a few days) restriction/closure of fishing in the area could result in short-term minor impacts to employment and income, whereas a longer (months) fishing restriction/closure could result in longer-term moderate to major impacts to employment and income of fishermen.</li> <li>• If a small to large spill from the proposed Facility reached the Columbia River, vessel diversions could potentially occur from 1 to 7 RMs downstream, producing moderate to major short-term impacts to business profit and wages for workers on vessels and at ports affected by the diversions. Short-term minor impacts could also result from lost incomes of crews for vessels delayed or unable to leave port for the duration of the event and response.</li> <li>• Depending on the location, timing, and duration of the spill event, the impact of a spill to marinas could be minor to major.</li> <li>• A crude oil spill of any size from the proposed Facility that extended beyond the boundary of the proposed Facility could have moderate impacts to industrial land within and near the Port. If the crude oil spill reached the Columbia River, minor to moderate shoreline property value impacts could occur from 1 to 7 RMs downstream, although the duration of property value effects resulting from</li> </ul>	<ul style="list-style-type: none"> <li>• A small to medium spill along the rail corridor could necessitate some temporary evacuation and relocation of nearby populations, leading to minor, short-term impacts to nearby population and housing.</li> <li>• Major, long-term impacts to population and housing could result from a large to very large crude oil spill that required a prolonged response effort. A large to very large crude oil spill along the rail corridor could produce major impacts to recreation- and tourism-related employment and income.</li> <li>• A large to very large oil spill in the rail corridor along the Columbia River mainstem could also produce major impacts to employment and income by jeopardizing some of the estimated \$46.6 million of annual expenditures by recreational salmon and steelhead fishermen in that reach of the Columbia River, and by adversely affecting commercial and subsistence fishing and fish populations.</li> <li>• A small to very large crude oil spill along the rail corridor would likely produce similar impacts to affected property values as those described for a similar-sized crude oil spill at the proposed Facility that extended beyond the proposed Facility boundaries and also reached the Columbia River.</li> <li>• A small to very large crude oil spill along the rail corridor could produce minor to major impacts to nearby low-income/disadvantaged and minority populations depending on the size and extent of the crude oil spill.</li> <li>• The potential impacts to population, housing, property values, and environmental justice from a large crude oil fire and/or explosion along the rail corridor would likely be similar to those for a large crude oil spill along the rail corridor, and a large crude oil fire and/or explosion at the proposed Facility.</li> <li>• The socioeconomic impacts from a small to medium crude oil spill along the vessel corridor would likely</li> </ul>	<ul style="list-style-type: none"> <li>• The socioeconomic impacts from a small fire along the vessel corridor would likely be negligible assuming the fire were controlled within the affected vessel.</li> <li>• The potential socioeconomic impacts from a large crude oil fire and/or explosion along the vessel corridor would likely be similar to the impacts described for a large crude oil fire and/or explosion at the proposed Facility or along the rail corridor that occurred near the Columbia River shoreline. However, these impacts could be felt by nearshore populations (including low-income/minority populations), businesses, and property owners along the vessel corridor near the location of the vessel fire and/or explosion.</li> </ul>	

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<p>contamination has been generally found to be temporary.</p> <ul style="list-style-type: none"> <li>Two census tracts within 0.5 mile of the proposed Facility have meaningfully greater concentrations of minority and low-income residents that could experience some short-term minor impacts from a crude oil spill at the proposed Facility (e.g., odor, noise, air quality, evacuations) depending on the size and extent of the crude oil spill.</li> <li>A large fire and/or explosion could produce minor, short-term impacts to nearby populations including temporary evacuation and relocation.</li> <li>A large fire and/or explosion at the proposed Facility could also produce major impacts to nearby populations and housing. These impacts could include injury to or death of local residents, and housing damage or destruction.</li> <li>A small fire at the proposed Facility would likely have negligible impacts to employment and income assuming the fire were contained within the proposed Facility boundary.</li> <li>A large fire and/or explosion at the proposed Facility could necessitate the closure of recreational fishing grounds or the delay/diversion of vessels around the proposed Facility, leading to similar impacts as those described for a spill from the proposed Facility that reached the Columbia River.</li> <li>A small fire at the proposed Facility would likely produce negligible impacts to property values assuming the fire were contained within the proposed Facility boundary.</li> <li>A large fire and/or explosion would likely produce similar impacts as those described for a spill from the proposed Facility that reached the Columbia River.</li> <li>The two census tracts within 0.5 mile of the proposed Facility with meaningfully higher minority or low-income populations could experience moderate to major impacts from a fire or explosion</li> </ul>	<p>be similar to the impacts described previously for a small crude oil spill that reached the Columbia River either along the rail corridor or from the proposed Facility.</p> <ul style="list-style-type: none"> <li>The potential socioeconomic impacts from a large to very large crude oil spill along the vessel corridor would likely be similar to those for a large crude oil spill at the proposed Facility that reached the Columbia River and a large to very large crude oil spill along the rail corridor that reached the Columbia River. However, these impacts could be felt by populations (including low-income/minority populations), businesses, and property owners along the vessel corridor from the location of the spill to beyond the mouth of the Columbia River.</li> </ul>	

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	at the proposed Facility if fire or explosion debris reached their neighborhoods resulting in impacts including injury, death, and property damage or destruction. Additional minor to moderate impacts include air quality concerns from smoke and particulates if prevailing winds blow toward these areas.		

BNSF = Burlington Northern Santa Fe, Ecology = Washington State Department of Ecology, GRP = geographic response plan, MFSA = Maritime Fire Safety Association, ODEQ = Oregon Department of Environmental Quality, Port = Port of Vancouver, RM = river mile, TAS = Troutdale Aquifer System, USCG = US Coast Guard, VFD = Vancouver Fire Department

# Fact Sheet

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## **Tesoro Savage Vancouver Energy Distribution Terminal Facility Draft Environmental Impact Statement**

### **Proposal's Sponsor:**

Tesoro Savage Petroleum Terminal LLC, a joint venture of Tesoro Refining & Marketing Company LLC, a subsidiary of Tesoro Corporation, and Savage Companies.

### **Lead Agency and Responsible Official:**

Washington State Energy Facility Site Evaluation Council (EFSEC); Stephen Posner, EFSEC Manager, P.O. Box 43172, 1300 S Evergreen Park Dr. SW, Olympia, WA 98504-3172.

### **Abstract:**

The proposed Facility would be a crude oil terminal capable of receiving an average of 360,000 barrels of crude oil per day by train, storing it onsite, and loading it onto marine vessels for delivery to refineries primarily located on the US West Coast. Crude oil would be delivered to the proposed Facility by railroad within "unit trains" composed of up to 120 sole-purpose crude oil tank cars. Existing railroad tracks belonging to the Burlington Northern Santa Fe (BNSF) railroad would be used to transport the crude oil from its source to the Port of Vancouver (Port). Starting in 2017, the proposed Facility could receive crude oil from any source with rail access to the Port; however, according to information provided by the Applicant, the most likely sources would be northern mid-continent crude oil produced in North Dakota and Montana, and in Canada. An average of four unit trains per day would arrive at the proposed Facility.

A comprehensive review of system alternatives, site alternatives, and onsite alternatives did not identify any reasonable alternatives to the Proposed Action described above. Therefore only the Proposed Action and the No Action Alternative were carried forward for detailed analysis in this Draft Environmental Impact Statement (EIS).

### **Project Location:**

The proposed Facility would be located on a 47.4-acre site located at Terminals 4 and 5 at the Port of Vancouver in the City of Vancouver, Washington.

### **Required Permits, Approvals, and Licenses:**

EFSEC's Site Certification Agreement (SCA) preempts otherwise applicable state and local regulatory permits pursuant to Revised Code of Washington (RCW) 80.50.110 and RCW 80.50.120. For informational purposes, Table 1-1 in the Draft EIS provides a list of these preempted state and local permitting requirements. Federal permits and requirements are identified in Table 1-2.

### **Authors and Principal Contributors to the Draft EIS:**

The Draft EIS was prepared by EFSEC's independent consultant, Cardno, Inc., with assistance from EnerSource Engineering and AECOM. Reports supporting the Draft EIS were completed by

Environmental Research Consulting, MainLine Management, Inc., Hebert Engineering Corp., EnerSource Engineering, and AECOM. Additional information on the authors and principal contributors is presented in Chapter 7 of the Draft EIS.

**Date of Draft EIS Issuance:**

November 24, 2015

**Date Draft EIS Comments are Due:**

January 8, 2016

You may submit your comments online at: <http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml> or in person at a public meeting (orally or in writing).

**Date, Time, and Location of Draft EIS Public Meetings:**

***City of Vancouver:***

January 5, 2016, 1:00 p.m. to 11 p.m. or until the last speaker

Clark County Event Center at the Fairgrounds  
Hall B  
17402 NE Delfel Road  
Ridgefield, WA 98642

***City of Spokane:***

January 7, 2016, 5:00 p.m. to 11 p.m. or until the last speaker

Centerplace Regional Event Center  
2426 N Discovery Place  
Spokane Valley, WA 99216

**Availability of the Draft EIS:**

The document is available at no cost on the EFSEC website at: <http://www.efsec.wa.gov/Tesoro-Savage/SEPA - DEIS/DEIS PAGE.shtml>. To obtain a printed copy or CD of the Draft EIS (for the cost of production), please contact Kali Wraspir at [kwraspir@utc.wa.gov](mailto:kwraspir@utc.wa.gov) or (360) 664-1365. The document is also available as a reference at local libraries and at:

Energy Facility Site Evaluation Council  
1300 S Evergreen Park Dr. SW  
Olympia, WA 98504-3172

**Libraries where Printed Draft EIS is Available:**

Washington State Library  
6880 Capitol Blvd SE  
Tumwater, WA 98501

Vancouver Main Community Library  
901 C Street  
Vancouver, WA 98660

Cascade Park Community Library  
600 Northeast 136th Ave  
Vancouver, WA 98684

Three Creeks Library  
800 Northeast Tenney Road  
Vancouver, WA 98685

Lewis D. Cannell Library  
1933 Fort Vancouver Way  
Vancouver, WA 98663

Clark County Law Library  
1200 Franklin Street  
Vancouver, WA 98660

Vancouver Mall Library Connection  
8700 Northeast Vancouver Mall Drive #285  
Vancouver, WA 98662

Spokane Public Library  
906 West Main Ave.  
Spokane, WA 99201

Mid-Columbia Libraries Pasco Branch  
1320 W Hopkins  
Pasco, WA 99301

Seattle Public Library: Central Library  
1000 Fourth Avenue  
Seattle, WA 98104

**Date of Final Lead Agency Action:**

After its evaluation is complete, EFSEC will submit a recommendation to the governor. If EFSEC recommends approval of the Facility, EFSEC will submit a draft SCA for the governor's signature. Within 60 days of receipt of EFSEC's recommendation, the governor may approve the Facility, reject the Facility, or direct EFSEC to reconsider the SCA. If an Application for Site Certification is denied, a proposal cannot be constructed and operated. The date of the governor's ultimate decision is not currently known.

**Location of Background Information:**

Documents regarding the SCA, scoping comments, public comments, land use, and adjudication can be found at <http://www.efsec.wa.gov/Tesoro-Savage.shtml>. The website also contains applications for related permits, schedules, transcripts of meetings, and relevant correspondence from the Applicant, EFSEC, and

other interested stakeholders on various aspects of the Application for Site Certification review and EIS process and is regularly updated with such information.

**Contact for Additional Information:**

Sonia Bumpus, EFS Specialist  
Energy Facility Site Evaluation Council  
1300 S Evergreen Park Dr. SW  
PO Box 43172  
Olympia, WA 98504-3172  
(360) 664-1363  
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6/10/2016

S&P Global: Tesoro cuts 2016 spending on project permitting delays

## S&P Global: Tesoro cuts 2016 spending on project permitting delays



Tesoro cut its 2016 capital budget as permitting delays have pushed out project timelines on its three major projects, lessening immediate spending needs, CEO Gregg Goff said Thursday.

Tesoro's \$1 billion capital spending budget for the year is \$500 million less than originally planned as the West Coast refiner waits for permits to wind its way through regulatory processes in Washington and California, he said on the company's first quarter earnings call.

"We do not see anything in that permitting process that gives us any concern about being successful in the permitting process, it just takes more time," said Goff of the three projects on the table.

<https://www.linkedin.com/pulse/sp-global-tesoro-cuts-2016-spending-project-delays-janet-mcgurty>

6/10/2016

S&amp;P Global: Tesoro cuts 2016 spending on project permitting delays

In California, Tesoro is waiting for regulatory approval from regional air quality regulators to approve of its Los Angeles Refinery Integration and Compliance Project.

The project would fully integrate Tesoro's legacy 104,500 b/d Wilmington, California, plant with the neighboring 257,300 b/d Carson plant. Tesoro paid BP \$1.075 million for 266,000 b/d Carson, California, refinery in 2013.

The project would reduce greenhouse emissions significantly as it includes a shutdown of the gasoline-making FCCU at the Wilmington section of the plant. Full integration would also allow 30,000 b/d to 40,000 b/d swing between distillate and gasoline, depending on margins.

Goff said the design, engineering and evaluation of the project is complete, and is now in permitting phase with local regulators South Coast Air Quality Management Board. He expects in the next two or three weeks they will go into the final phase before the permit is issued.

"We expect to have the necessary permits and approvals by the end of the year and will begin construction thereafter," he said.

#### CRUDE BY RAIL STALLS

In the third quarter of 2013, Tesoro and joint venture partner Savage were granted a lease by the port of Vancouver, Washington, to build a 360,000 b/d crude oil rail-to-marine terminal which would bring in crude from North Dakota and the Rockies to its West Coast refineries.

At this time, crude by rail volumes were picking up. Crude volumes travelling west primarily from the Midwest's Bakken field and the Rockies' D-J Basin was picking up, rising to peak at an average 145,000 b/d and 11,723 b/d in 2014, Energy Information Administration data shows. .

Originally Tesoro expected to get the permit in the third quarter of 2014 and have the facility up and running by early 2015.

Instead, today they are waiting for Washington State's Energy Facility Site Evaluation Council adjudicative phase with hearings to be held from June 27, 2016 to July 29, 2016.

However, Goff is hopeful the process is moving forward.

<https://www.linkedin.com/pulse/s&p-global-tesoro-cuts-2016-spending-project-delays-janet-mcguiry>

6/10/2016

S&P Global: Tesoro cuts 2016 spending on project permitting delays

"We can now see more of the light at the end of the tunnel than we have for some time. The hearings are formally set for the end of June through about 30 days, so the latter part of July," he said.

"We expect a final Environmental Impact Statement to be issued this fall, followed by a recommendation to the Governor of Washington," Goff added.

#### PREPARING FOR TIER 3

Tesoro is also waiting from the state of Washington for approval of its Clean Product Upgrade Project at its 120,000 b/d Anacortes refinery. The project will production yields of clean products like gasoline, and blending components while diversifying the product slate announced in late 2014. The project includes a mixed xylenes component, a naphtha isomerization project will improve yields and also lower costs. It will also prepare the refinery to make Tier 3 specification gasoline ahead of the 2017 mandate.

"Along the way we were required to do some additional work on permitting that was unexpected last summer when we developed our plans and that's moved that project out", said Goff, who did not give a timeline.

"So in all three projects, the delays are attributable to increased time in the permitting process," he said. "We do not see anything in that permitting process that gives us any concern about being successful in the permitting process, it just takes more time."



Written by

The Viacom saga continues: National Amusements, the holding company through which Sumner Redstone controls Viacom, [is looking for new Viacom board members](#). This isn't a shocker—speculation of a board shake-up began after George Abrams and Viacom CEO Philippe Dauman were removed from National Amusements' board a few weeks ago. On the list of potential board replacements, reports the [Wall Street Journal](#), are former Time Warner exec Kenneth Lerer, ex-Sony Entertainment President Nicole Seligman, and former Discovery Communications CEO Judith McHale.

Don't mess with Texas (drivers): Former Lyft and Uber drivers in Austin, TX say Uber and Lyft [broke federal law](#) when they abruptly stopped

<https://www.linkedin.com/pulse/s-p-global-tesoro-cuts-2016-spending-project-delays-janet-mcgurty>

6/10/2016

S&amp;P Global: Tesoro cuts 2016 spending on project permitting delays

operations in the city. Drivers filed a suit in San Francisco (where the companies are based) saying the two ride-sharing services violated a law stating they needed to give sixty days' notice to employees before a 'mass layoff'. It's the latest in the are-they-or-aren't-they battle over classification of drivers as employees or independent contractors, but seems to be the first use of the [1988 Worker Adjustment and Retraining Notification \(WARN\) Act](#) against the companies.

Tesla in the hot seat? The National Highway Traffic Safety Administration (NHTSA) is looking into potential suspension problems on Tesla's Model S electric sedans. The org is looking into reports and getting information from owners, although Tesla says there are no safety defects in its Model S or Model X. This is a [preliminary step](#) before deciding whether to launch a formal investigation.

I, for one, welcome our new robot overlords: [Three of the world's ten largest employers](#) are already replacing thousands of workers with robots. Foxconn, a manufacturer who works with Amazon, Apple, and Google, has already replaced a whopping 60,000 workers with robots. Walmart, [as we reported previously](#), is testing drones instead of human inventory scanners. And the US Department of Defense, the #1 global employer, already flies the world's largest fleet of unmanned vehicles. A study by Citi and Oxford University estimates that 77% of all jobs in China are at risk of automation, as well as 57% of jobs across the 34 OECD countries.

Puerto Rico relief passes the House: The US House of Representatives passed, [by a vote of 297-127](#), legislation creating a federal control board to help Puerto Rico with its debt. The bill now goes to the Senate, where it will likely move promptly to be approved in time for the July 1st deadline for Puerto Rico's \$1.9B debt payment.

[Verizon really WAS lowballing Yahoo](#): [According to CNBC](#), Verizon's \$3.5B bid for Yahoo's web assets was on the lower end, below several offers above the \$5B mark. Verizon may have to buy assets it hasn't yet targeted, like Yahoo's patents and real estate, [notes Eric Jackson of SpringOwl Management](#), if it wants to stay in the game.

A fallen unicorn, coming to a theater near you: That was fast. Jennifer Lawrence is lined up to play Elizabeth Holmes, the founder of beleaguered startup Theranos, [in a new film](#). It will be directed by "The Big Short"'s Adam McKay—so this one's gonna be good. "If McKay could turn the housing bubble into a digestible and hilarious movie, we have no doubt he will perform the same magic on the meltdown of Theranos," [says Tech Insider](#).

6/10/2016

Vancouver Port Gives Oil Companies What They Want — More Time . News

## Vancouver Port Gives Oil Companies What They Want — More Time . News

Eric LaBrant won the 2015 race for the Port of Vancouver commissioner. He has been a critic of the Vancouver Energy Project.

Christina Belasco/OPB

Commissioners at the Port of Vancouver unanimously approved an amended lease with the backers of a proposed oil terminal Friday.

If Tesoro-Savage accepts the amendments, it will effectively extend the lease, giving the companies more time to receive state approval for the project.

The port and the companies were facing what amounted to an Aug. 1 deadline on the lease. Without the extension, [the future the project seemed uncertain](#).

If built, the Vancouver Energy Project oil terminal would be the largest oil-by-rail facility in the country. It could move 360,000 barrels of Baaken crude oil from North Dakota, through the Columbia River Gorge and onto ships bound for refineries on the West Coast.

Vancouver Energy Project's spokeswoman Tina Barbee said the companies are reviewing the port's lease amendment, but are glad the state's review has the opportunity to continue.

"We're pleased to have received a unanimous decision by the Port Commission, which affirms the value of the Vancouver Energy Project and demonstrates their continued commitment to the project," Barbee said in a statement.

The new terms from the port stipulate that crude oil sent through the Vancouver Energy Project must be bound for domestic ports and carry what's called "pipeline-grade" crude.

Tesoro-Savage's monthly payment to the ports would also increase from \$50,000 to \$100,000 starting in May.

Under the amended lease, the terminal would have a new deadline of March 31, 2017 to get the permits it needs. After that, the Port of Vancouver and Tesoro-Savage will assess the project every three months.

"I just didn't feel like it was fair to cut them off now, even though some of the fault was theirs," said Vancouver Port Commissioner Brian Wolfe following the meeting.

<http://www.opb.org/news/article/vancouver-port-oil-terminal-lease-extension/>

1/2

6/10/2016

Vancouver Port Gives Oil Companies What They Want — More Time . News

The process of reviewing the lease began last week after Tesoro-Savage proposed an amendment with the port, effectively asking for more time to complete the state's permitting process.

Port Commissioner Jerry Oliver began Friday's meeting by proposing commissioners approve the lease extension.

The meeting also touched on climate change and other topics, related to, but not directly about the oil terminal itself.

Oliver said he supports the terminal and doesn't believe that humans burning fossil fuels is the cause of climate change.

"To date, I suggest to you that it has not been born out by facts," Oliver said. "I do not believe that climate change is anthropogenic in nature. Science may yet prove me wrong, but to date I have not yet seen the evidence."

At one point, Oliver likened those who oppose the project because of their concerns about fossil fuels to his relatives who fought for the Confederacy during the Civil War.

"They were sincere like you, and like you, sincerely wrong," Oliver said.



**Attachment 1**

Phyllis Fox, Ph.D., QEP, PE, DEE  
745 White Pine Ave.  
Rockledge, FL 32955  
321-626-6885

June 10, 2014

By: Email

Elizabeth Klebaner  
Adams Broadwell Joseph & Cardozo  
601 Gateway Blvd., Suite 1000  
South San Francisco, CA 94080  
eklebaner@adamsbroadwell.com

Re: *Comments on the Initial Study and Draft Negative Declaration for the Tesoro Storage Tank Replacement and Modification Project*

Dear Ms. Klebaner,

Per your request, I have reviewed the Initial Study and Draft Negative Declaration (Neg.Dec.) prepared by the South Coast Air Quality Management District (SCAQMD) for the Tesoro Storage Tank Replacement and Modification Project,<sup>1</sup> as well as the records referenced in the Neg. Dec. that have been provided by the District to your firm. I have also conducted an independent investigation of the activities described in the Neg.Dec. The Tesoro Storage Tank Replacement and Modification Project is proposed by Tesoro Refining & Marketing Company LLC (Applicant). The replacement and modifications addressed in the Neg.Dec. include replacing two 80,000 barrel (bbl) fixed roof storage tanks with two 300,000 bbl floating roof storage tanks, changing the service and throughput of two existing storage tanks, and replacing pipelines in the tank farm (Project) within the Applicant's Los Angeles Refinery.<sup>2</sup>

As described by the Neg.Dec., the Applicant's Los Angeles Refinery consists of two adjacent facilities, the Wilmington Refinery (Wilmington Operations) and the recently acquired Carson Refinery (Carson Operations). The Applicant is integrating the Wilmington Operations and the Carson Operations to operate as one Refinery. In particular, Tesoro plans to reconfigure the Wilmington and Carson Refineries to achieve operational synergies through an integrated crude oil supply, the optimization of

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<sup>1</sup> South Coast Air Quality Management District (SCAQMD), Notice of Intent to Adopt a Draft Negative Declaration, Tesoro Storage Tank Replacement and Modification Project, April 23, 2014.

<sup>2</sup> ND, pp. 1-1 to 1-4.



intermediate feedstocks and product distribution costs, improvements in light product yield, and reductions in refining costs.<sup>3</sup>

According to the Neg.Dec., Tesoro also operates a Marine Terminal at the Port of Long Beach (POLB) at Berths 84-87 and an underground pipeline that connects the Terminal to the Wilmington Refinery.<sup>4</sup> This underground pipeline supplies the crude oil that will be involved in Project operations.<sup>5</sup> Publicly available information indicates that the Applicant transferred ownership of the Marine Terminal to Tesoro Logistics LP<sup>6</sup> in September 2012.<sup>7</sup> The Applicant also transferred ownership of other nearby marine terminals to Tesoro Logistics LP, including POLB Berths 167-169 and those acquired in the purchase of the Carson Operations from BP to Tesoro Logistics LP (POLB Berths 76-78 and 121<sup>8</sup>).<sup>9</sup> The partnership agreement between the Applicant and Tesoro Logistics LP for the Marine Terminal includes minimum throughput commitments (Marine Terminal Agreement).<sup>10</sup>

<sup>3</sup> Tesoro Gets FTC OK for BP Refinery Acquisition, Bakken Oil Business Journal, May 17, 2013 (5/17/13 BOBJ). Available at: <https://www.facebook.com/BakkenOilBusinessJournal/posts/382670525179174> and attached as Exhibit B.

<sup>4</sup> ND, p. 1-7 & Fig. 1-5.

<sup>5</sup> Ibid.

<sup>6</sup> Tesoro Logistics is a limited partnership formed by Tesoro in April 2011 to own, operate, develop and acquire crude oil and refined products logistics assets for Tesoro Refining and Marketing. Tesoro owns 52% of the outstanding partnership units. Tesoro Logistics provides pipeline transportation, crude oil trucking, terminaling services, and crude and refined products storage operation and storage services within Tesoro's refining and market supply chain. See: <http://www.getfilings.com/sec-filings/120904/TESORO-LOGISTICS-LP-8-K/d406099dex992.htm>.

<sup>7</sup> Tesoro Logistics, New Release, September 12, 2012 (transferred assets described as a two-vessel berth dock, six storage tanks with a combined capacity of 235,000 bbl and six related pipelines with 70,000 bbl/day throughput connecting the Marine Terminal, Tesoro's refinery, and other third-party facilities), Available at: <http://www.tesorologistics.com/phoenix.zhtml?c=242247&p=irol-newsArticle&ID=1735351&highlight=>. See also: Long Beach Berth Access, Use and Throughput Agreement, Available at: <http://www.sec.gov/Archives/edgar/data/50104/000119312512392844/d412270dex104.htm>.

<sup>8</sup> Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft Supplemental Environmental Impact Statement/Draft Subsequent Environmental Impact Report (Pacific L.A. Marine Terminal SEIR/DSEIR), Chapter 2, p. 2-66 and Appendix DI; Available at: [http://www.portoflosangeles.org/EIR/PacificLAMarine/SEIR/seir\\_pacificLA\\_marine.asp](http://www.portoflosangeles.org/EIR/PacificLAMarine/SEIR/seir_pacificLA_marine.asp).

<sup>9</sup> U.S. Securities & Exchange Commission, Tesoro Logistics LP Form 10-K, Fiscal Year Ended December 31, 2013, See p. 4, "Los Angeles Assets Acquisitions". Available at: <http://www.tesorologistics.com/phoenix.zhtml?c=242247&p=irol-sec&seccat01enhanced.1rs=11&seccat01enhanced.1rc=10&genphase2=true>.

<sup>10</sup> Tesoro Sells Marine Terminal and Pipelines to Tesoro Logistics, Tank Storage Magazine, December 2012, p. 21. Available at: <http://www.scribd.com/doc/213481496/Tank-Storage-Magazine>. See also: Long Beach Berth Access, Use and Throughput Agreement (Marine Terminal Agreement), available at: <http://www.sec.gov/Archives/edgar/data/50104/000119312512392844/d412270dex104.htm>. This agreement was modified on December 6, 2013 (<http://www.sec.gov/Archives/edgar/data/50104/000119312513465459/d638208dex109.htm>), eliminating the specification limits in Sec. 7.0 and Annex D. However, this eliminated material is relevant to the environmental baseline for evaluating Project impacts.

The Wilmington Operations include 20 tanks that store crude oil and other heavy petroleum liquids (Tank Farm).<sup>11</sup> This Tank Farm is the site of the proposed Project. Crude oil is unloaded at the Marine Terminal and sent via underground pipeline to the Tank Farm. The crude oil is delivered to the tanks in the Tank Farm at a baseline throughput rate of 5,000 bbl/hr per tank<sup>12</sup> using local pipelines,<sup>13</sup> shown on Neg.Dec. Figure 1-3.

Based on my investigation, I conclude that the analysis presented in the Neg.Dec. inadequately addresses the Project's environmental impacts because it fails to identify a reasonably foreseeable crude switch and reasonably foreseeable throughput increases at the Marine Terminal and the Applicant's Los Angeles Refinery. The Neg.Dec. also fails to include a complete and accurate description of the Project, fails to identify potentially significant impacts from the modifications that are analyzed in the Neg.Dec. and is otherwise inadequate.

First, the Neg.Dec. fails to disclose the throughput and composition of the baseline crudes at the Los Angeles Refinery. This information is required to determine the impact of the Project on air quality, hazards, and public health impacts.

Second, the Neg.Dec. fails to disclose that the Project would debottleneck the throughput of both the Tank Farm and the Marine Terminal by replacing the existing 12-inch diameter pipeline within the Tank Farm with a new, 42-inch diameter pipeline. This modification alone allows for a throughput increase of a factor of 12.25 at the Tank Farm.

Third, the Neg.Dec. fails to disclose and address the environmental impacts of foreseeable modifications at the Refinery to allow it to more efficiently process cost-advantaged crude oils, including Bakken and tar sands crudes.

Finally, the Neg.Dec. fails to identify the Project's significant and unmitigated air quality, worker and public health, and hazards impacts, described fully below.

My resume is included in Exhibit A to these Comments. I have over 40 years of experience in the field of environmental engineering, including air emissions and air pollution control; greenhouse gas emission inventory and control; air quality management; water quality and water supply investigations; hazardous waste investigations; hazard investigations; risk of upset modeling; environmental permitting;

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<sup>11</sup> ND, p. 1-1.

<sup>12</sup> ND, p. 1-8.

<sup>13</sup> ND, p. 1-1.

nuisance investigations (odor, noise); environmental impact reports, including CEQA/NEPA documentation; risk assessments; and litigation support.

I have M.S. and Ph.D. degrees in environmental engineering from the University of California at Berkeley with minors in Hydrology and Mathematics. I am a licensed professional engineer (chemical, environmental) in five states, including California; a Board Certified Environmental Engineer, certified in Air Pollution Control by the American Academy of Environmental Engineers; and a Qualified Environmental Professional, certified by the Institute of Professional Environmental Practice.

I have prepared comments, responses to comments and sections of EIRs for both proponents and opponents of projects on air quality, water supply, water quality, hazardous waste, public health, risk assessment, worker health and safety, odor, risk of upset, noise, land use and other areas for well over 100 CEQA documents. This work includes Environmental Impact Reports (EIRs), Negative Declarations (NDs), and Mitigated Negative Declarations (MNDs) for all California refineries as well as various other permitting actions for tar sands and light shale crude refinery upgrades in Indiana, Louisiana, Michigan, Ohio, South Dakota, Utah, and Texas and liquefied natural gas (LNG) facilities in Texas, Louisiana, and New York.

My work has been cited in two published CEQA opinions: (1) *Berkeley Keep Jets Over the Bay Committee, City of San Leandro, and City of Alameda et al. v. Board of Port Commissioners* (August 30, 2001) 111 Cal.Rptr.2d 598 and *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310.

#### **I. THE PROJECT DESCRIPTION IS MISLEADING AND INACCURATE**

The Neg.Dec. claims that the purpose of the Project is to increase the rate of crude oil unloading from ships and the amount of crude oil that can be stored. ND, pp. 1-1, B-3. It would certainly achieve these goals. However, in addition, the Neg.Dec. makes a number of assertions about what the Project would not do, which appear to be misleading and/or incorrect. The Neg.Dec. asserts the Project would not:

- change "types" of crude oils delivered to the Wilmington Operations;
- change or increase the frequency of ship deliveries on a daily basis;
- increase the total amount of crude oil delivered to the Wilmington Operations on an annual basis;
- alter the methods of crude oil delivery (e.g., continue to be delivered via ships and pipelines);
- change the crude throughput of the Wilmington Operations or any downstream refining process.<sup>14</sup>

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<sup>14</sup> ND, pp. 1-1 to 1-4 & B-3.

My review of the Neg.Dec. and supporting documents indicates that the proposed modifications are designed to facilitate a crude switch, a throughput increase at the Marine Terminal, a throughput increase at the Tank Farm, and potentially, also facilitate a throughput increase and/or a modification of the configuration of the Applicant's Los Angeles Refinery. Each of these points is discussed below.

**A. The Neg.Dec. Fails to Identify a Crude Switch**

The Neg.Dec. asserts that the Project "would not change the types of crude oils delivered to the Wilmington Operations."<sup>15</sup> Elsewhere, it asserts that the Wilmington Operations are designed to and have processed crude oils "with characteristics of light-to heavy-gravity and low to high sulfur content (referred to as light sweet to heavy sour crude oils)."<sup>16</sup>

However, the Neg.Dec. does not identify the "types of crude" that are currently, or were historically delivered to the Wilmington Operations. The Project includes installing two new crude oil tanks that have very high vapor pressure limits, higher than any other crude tanks at the Refinery, suggesting the Project is designed to accommodate a crude switch that the Applicant has disclosed in other fora. Further, information reviewed below suggests that most of the crude that would be imported and stored in the Tank Farm would be refined at the Carson Operations, not Wilmington, calling into question the Neg.Dec.'s Project description.

The word "type" is so vague that it precludes an accurate evaluation of the Project's impacts on the environment. Type is a relative term that encompasses a fairly broad range of crudes. The chemical and physical characteristics that determine environmental impacts can vary greatly within crude "types" and thus result in a wide range of environmental impacts.

Impacts due to changes in crude quality were not considered in the Neg.Dec, but dismissed with a vague and unsupported assertion that the crude "type" would not change. Changes in crude quality can include properties such as vapor pressure (which determines how much VOCs and TACs will be emitted); flammability and flash point (which determine the potential for fires and explosions and their consequences); chemical speciation (which determines public health and odor impacts); Total Acid Number (TAN), which determine the potential for corrosion and related accidents; and API gravity, sulfur and nitrogen content (which determine emissions during refining), among others.

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<sup>15</sup> ND, p. 1-1.

<sup>16</sup> ND, p. 2-24.

The inadequacy of "type" to classify crudes is demonstrated by the list of crudes received at the Marine Terminal in the baseline.<sup>17</sup> This list includes chemical composition data that can be used to demonstrate that type is not an adequate description of crude quality.

The list includes several "heavy" crudes (API gravity <24) that can be imported, including two Canadian tar sands crudes (Cold Lake, Wabasca) and heavy crudes from Peru, Mexico, and Ecuador. Sulfur, for example, in these crudes ranges from 1.14% (Peru) to 3.9% (tar sands) and mercaptan from 19 ppm (Ecuador) to 248 ppm (tar sands). Thus, the tar sands crudes, a possible replacement for a large part of the crude slate at the Los Angeles Refinery, would increase odiferous sulfur emissions from tanks and fugitive components. Refining the tar sands crudes would also require an increase in sulfur removal capacity and much more energy, increasing greenhouse gas and other combustion emissions, compared to other "heavy" baseline crudes.

Likewise, "light crudes" (API gravity >32) included in this list include Alaska North Slope (ANS), Arab Light, Plutonio, and Sokol. The sulfur content of these crudes ranges from 0.54% (ESPO) to 1.87% (Arab Light) and mercaptans from 1 ppm (Plutonio) to 111 ppm (ESPO). These "light" crudes have very different chemical and physical characteristics that result in different environmental impacts when they are transported, stored, and refined

Thus, without identifying the baseline and future crude slate with more specificity, providing composition and throughput data for the baseline and post-Project crude slate, the Neg.Dec. simply cannot accurately identify the Project's environmental impacts and is deficient. The broad generic classifications used in the Neg.Dec. are not useful for determining environmental impacts, i.e., the broad classification of "heavy" or "light" or "light-to heavy-gravity and low to high sulfur content" reveal nothing about chemical and physical characteristics of crudes and thus the impacts from transporting, storing, and refining them. The specific crude(s), on the other hand, allows properties to be determined and thus, impacts of transporting, storing, and refining them to be determined.

Tesoro's California refineries currently refine 19% foreign heavy crudes, 30% foreign light crudes, 19% Alaska North Slope (ANS), 17% California heavy crudes, and 15% North American crudes.<sup>18</sup> My review of the Neg.Dec., supporting files, and other

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<sup>17</sup> Marine Terminal Agreement, Annex D.

<sup>18</sup> Tesoro, Transformation through Distinctive Performance, Simmons Energy Conference, February 27, 2014, at p. 18 (2/27/13 Tesoro Presentation). Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations>, attached as Exhibit C. Elsewhere, it is reported that the Wilmington Refinery primarily runs heavy crude produced in California and imported from abroad, while the Carson Refinery runs oil from Alaska's North Slope, the Middle East, and West Africa. See: Tesoro to Shut Los Angeles Refinery Hydrocracker in January for Repairs, Hydrocarbon Processing,

publicly available information indicate that one purpose of the Project is to allow the Los Angeles Refinery to replace declining ANS and California crudes and more expensive foreign crude oil imports<sup>19</sup> with cost-advantaged North American crude oils.

1. *Bakken Crudes Are The Most Likely Post-Project Imports*

The Project is designed to facilitate a crude switch. The Project description states that the two new 300,000 bbl floating roof crude oil storage tanks would be permitted with a true vapor pressure (TVP) limit of <11 psi.<sup>20</sup> This corresponds to a Reid Vapor Pressure (RVP) of about 12 psi at a stock temperature of 66 F, based on AP-42,<sup>21</sup> Fig. 7.1-13a.

Bakken crude oils are the only crude oils that I am aware in the market today that have a TVP of 11 psi. The Wall Street Journal, for example, analyzed data collected by Calpine Pipeline, which tested crudes from 86 locations world-wide for vapor pressure. The Journal reported:<sup>22</sup>

"[L]ight, sweet oil from the Bakken Shale had a far higher vapor pressure - making it much more likely to throw off combustible gases - than crude from dozens of other locations...According to the data, oil from North Dakota and the Eagle Ford Shale in Texas had vapor-pressure readings of over 8 pounds per square inch, although Bakken readings reached as high as 9.7 PSI. U.S. refinery Tesoro Corp. TSO +1.01%, a major transporter of Bakken crude to the West Coast, said it regularly has received oil from North Dakota with even more volatile pressure readings - up to 12 PSI. By comparison, Louisiana Light Sweet from the Gulf of Mexico, had vapor pressure of 3.33 PSI, according to the Calpine data."

This data, as summarized by the Wall Street Journal, is shown in Figure 1. This figure shows that all crude oils that are designated as "light" do not have the same vapor pressure and thus, the same environmental impacts when stored and transported. The more volatile the crude, the higher the VOCs, TACs, and greenhouse gas (GHG) emissions, the higher the flammability, and the greater the consequences in

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Available at: <http://www.hydrocarbonprocessing.com/Article/3283087/Tesoro-to-shut-Los-Angeles-refinery-hydrocracker-in-January-for-repairs.html>.

<sup>19</sup> California Energy Almanac, Crude Oil Supply Sources to California Refineries, Available at: [http://energyalmanac.ca.gov/petroleum/statistics/crude\\_oil\\_receipts.html](http://energyalmanac.ca.gov/petroleum/statistics/crude_oil_receipts.html).

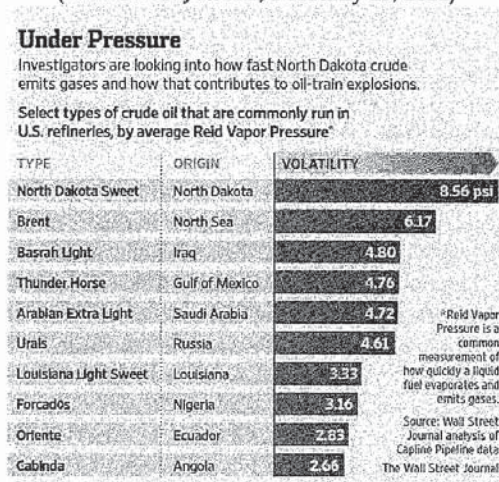
<sup>20</sup> ND, Table 1-1.

<sup>21</sup> U.S. EPA, Compilation of Air Pollutant Emission Factors, Available at: [www.epa.gov/ttnchie1/ap42/42/](http://www.epa.gov/ttnchie1/ap42/42/).

<sup>22</sup> Russell Gold, Analysis of Crude From North Dakota Raises Further Questions About Rail Transportation, Wall Street Journal, February 23, 2014.

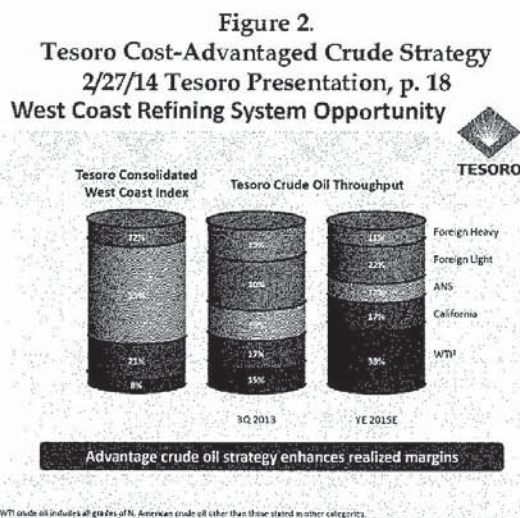
the event of an accident. The only “light”<sup>23</sup> crude oil that Tesoro has admitted to refining at its California refineries in its filings with the U.S. Security and Exchange Commission is Basrah, an imported Iraqi light crude oil with a vapor pressure that is half that of Bakken. Thus, any claim in the Neg Dec. that the crude “type” will not change is clearly invalid in terms of disclosing the Project’s environmental impacts, if the claim is based on replacing “light” crudes (Basrah) with different “light” crudes (Bakken).

Figure 1.  
Volatility (psi) of Some Commonly Refined Crude Oils  
(Wall Street Journal, February 23, 2014)



The Applicant’s proposed vapor pressure (TVP) limit of <11 psi for the new storage tanks is a design parameter that is consistent with Tesoro’s widely reported plans to reduce operating costs by replacing a portion of its crude slate with certain cost-advantaged North American crudes, labeled “WTI” in Figure 2.

<sup>23</sup> Bashrah has an API gravity of 29.7 and thus, while very light, falls just below the “light” threshold of 32 used in the industry to classify crudes. Therefore, it is a very light “medium” crude under the usual classification scheme. However, Tesoro itself classifies it as “light” in its SEC filings (SEC 10-Q, Quarter Ending March 31, 2014).



Bakken crudes, which are a cost-advantaged North American crude, would most likely replace foreign heavy and light crudes and Alaska North Slope (ANS) that are currently refined at the Los Angeles Refinery, as illustrated in Figure 2.<sup>24</sup> The CEO of Tesoro, Greg Goff, stated in the first quarter 2014 earnings call that Bakken is the “right supply source” for the Los Angeles Refinery.<sup>25</sup> However, the tanks required to store these light crudes during unloading currently do not exist at the Refinery, which imported much heavier crudes in the baseline crude slate.<sup>26</sup>

Tesoro has reported that its cost-advantaged feedstock opportunity at its Los Angeles refinery is currently up to 15% California heavy, with the potential to increase this up to 50% California heavy and Bakken.<sup>27</sup> California oil production is not increasing.<sup>28</sup> Thus, up to 35% of the crude oil supplied to the Los Angeles Refinery could be Bakken crude (50% - 15% = 35%). As the refining capacity of the Los Angeles Refinery is 363,000 bbl/day, Tesoro’s projections indicate that up to 127,000 bbl/day of Bakken could be refined.

<sup>24</sup> See, e.g., Greg Goff, Barclays CEO Energy-Power Conference, September 2012, p. 9, Available at: <http://www.scc.gov/Archives/edgar/data/50104/000005010412000072/exhibit991presentation95.htm>.  
<sup>25</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Bank of America questions at 44:02 – 44:32 min. (Bakken differentials), Available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en> and included as Exhibit D.

<sup>26</sup> Marine Terminal Agreement, Annex D, RVP column.  
<sup>27</sup> 2/27/14 Tesoro Presentation, pp. 13, 14 and 1/9/14 Tesoro Presentation, p. 17.  
<sup>28</sup> 1/9/14 Tesoro Presentation, p. 20 and attached as Exhibit E.



The amount of Bakken that could potentially be refined at the Los Angeles Refinery is roughly equal to excess capacity in the Applicant's Port of Long Beach (POLB) marine terminals, including the Project Marine Terminal, and could be greater than the baseline throughput of the Los Angeles Refinery. See further discussion of elsewhere in these Comments.

This is consistent with statements made by Tesoro in its December 10, 2013 Analyst and Investor Presentation, where it stated: "Los Angeles, which is the largest of our West Coast facilities, will potentially see an increase of 125,000 to 130,000 barrels a day of advantaged crude."<sup>29</sup> Bakken would replace foreign imports and ANS,<sup>30</sup> as shown in Figure 2. Bakken is attractive as an alternative to ANS as it yields 14% to 16% more gasoline and distillate than ANS.<sup>31</sup> Thus, Bakken crudes are the likely cost-advantaged crudes to be imported and stored at the Tank Farm, and specifically the two new proposed storage tanks, in significant amounts.

The Bakken crude would be supplied via a new 360,000 bbl/day rail-to-marine terminal facility at the Port of Vancouver in Washington (Vancouver Terminal) that Tesoro is currently building with Savage Companies. This Terminal will import North American "cost-advantaged" crudes by rail and export them by ship to California and Alaska. This terminal is key to Tesoro's plans to import Bakken and other cost advantaged crudes to its Los Angeles Refinery.<sup>32</sup>

The relationship between the Applicant's Los Angeles Refinery and Vancouver Terminal operations is graphically illustrated in Figure 2, which shows crude moving from the Bakken region by rail to the Vancouver Terminal and then by ship to the Los Angeles Refinery. The Project is an initial phase of the Applicant's larger plan to import significant amounts of Bakken crude to the Los Angeles Refinery via Tesoro's Vancouver Terminal and Marine Terminal and other Tesoro LP terminals in the POLB. However, a switch to other cost-advantaged crudes cannot be ruled out, as discussed elsewhere in these Comments.

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<sup>29</sup> Thomson Reuters Streetevents Edited Transcript, TSO - Tesoro Analyst and Investor Presentation, December 10, 2013, p. 11.

<sup>30</sup> Tesoro, Transformation through Distinctive Performance, 2014 Analyst and Investor Day, December 10, 2013, p. 39 (Feedstock advantage: "Replace ANS and foreign crude oil with higher value alternatives."). Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations>.

<sup>31</sup> 1/9/14 Tesoro Presentation, p. 16.

<sup>32</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff response to Barclay questions at 28:54 - 30:19 min, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

Figure 2.  
 Cost-Advantaged Crude Transportation Options  
 1/9/14 Tesoro Presentation, p. 19<sup>33</sup>  
 (Legend)<sup>34</sup>



The Vancouver Terminal will export 80% Bakken crude and 20% other crudes<sup>35</sup> and is expected to be operational in mid-2015.<sup>36</sup> The CEO of Tesoro, Greg Goff, has indicated that the Los Angeles Refinery can take the entire shipment. There are “no restrictions on how much we can take...”<sup>37</sup> The Applicant’s SCAQMD applications for Tanks 80079, 300035, and 300036 all contain the same two crude oil Material Safety Data

<sup>33</sup> Tesoro, Deutsche Bank Energy Conference, January 9, 2014, p. 19 (1/9/14 Tesoro Presentation). Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations>.

<sup>34</sup> Thomson Reuters Streetevents Edited Transcript, TSO - Tesoro Analyst and Investor Presentation, December 10, 2012, p. 13: “The blue arrows represent Tesoro’s ability to move advantaged North American crude from the production fields to the Port of Vancouver...and then through the entire West Coast system. The red arrows represent our waterborne domestic and foreign capabilities.” Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-transcriptsarchive>.

<sup>35</sup> Tesoro Savage, Application for Site Certification Agreement (Vancouver Application), vol. 1, August 29, 2013, Available at: <http://www.efsec.wa.gov/Tesoro%20Savage/Application/EFSEC%202013-01%20Volume%201/EFSEC%202013-01%20-%20Compiled%20PDF%20Volume%201.pdf>.

<sup>36</sup> 2/27/13 Tesoro Presentation, p. 17 and Kristen Hays and Erwin Seba, Update 1 - Tesoro Delivering First Bakken Crude Unit Train to California, Reuters, September 11, 2013, Available at: <http://www.reuters.com/article/2013/09/11/tesoro-rail-crude-idUSL2N0H70U420130911..>

<sup>37</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Paul Cheng, Barkley questions at 31 min. et seq. Available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

Sheets<sup>38</sup> as found in the Vancouver Application, which would supply the Marine Terminal. These are generic MSDSs for “light sweet crude oil,” that are consistent with Bakken crude and “sweet heavy crude oil,” consistent with some Canadian tar sands, discussed elsewhere in these Comments. As the Vancouver Terminal will export other crudes, including tar sands crudes, these cannot be eliminated as part of the imported supply to the Wilmington Operations.

Thus, the < 11 psi vapor pressure limit for new tanks 300035/300036, coupled with identical crude composition data reported in MSDSs for SCAQMD permit tank applications and the Vancouver Terminal Application establish that the Project is designed to facilitate the crude switch that is widely reported by Tesoro and Tesoro Logistics.

2. *Tar Sands Crudes Are Also A Viable Option for Project Implementation*

While publicly available information and the proposed vapor pressure limit on the new tanks (<11 psi) suggests that Bakken crudes are currently the most likely Project feedstock, the Project description is general enough to allow other cost-advantaged crudes such as tar sands, given the Los Angeles Refinery’s configuration and Project design. Tar sands crude exports to the West coast are currently challenged by logistics, but this may change in the future.

The Marine Terminal Agreement lists crudes that could be accepted at the Marine Terminal in the baseline. These include two Canadian tar sands crudes, Cold Lake and Wabasca.<sup>39</sup> In 2012, the Wilmington Refinery reportedly ran 1,000 bbl of tar sands crude, less than 2% of its throughput.<sup>40</sup> The U.S. Energy Information and Administration (US EIA) provide data on foreign crude imports. The data for the Wilmington Operations indicates it has continued to import tar sands crudes.<sup>41</sup> The Project description includes modifications that would facilitate an increase in tar sands imports. These include an increase in the throughput of Tank 80079, which is permitted to store heavy crude oil and whose throughput is being increased.<sup>42</sup> Further, the two new 300,000-bbl floating roof tanks (300035/36) will be equipped with heating coils

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<sup>38</sup> Applications 545745 (Tanks 300035 & 300036), 545646 (Tanks 300035 & 300036), and 556835 (Tank 80079) all contain the same MSDSs for “light sweet crude oil” and “sweet heavy crude oil” as contained in the Vancouver Application, Appx. G.

<sup>39</sup> Marine Terminal Agreement, Annex D.

<sup>40</sup> OilChange International, Refinery Report, Available at: <http://refineryreport.org/refineries-list.php>.

<sup>41</sup> U.S., EIA Data, Tesoro Corp. Crude Oil Imports, Port City: Los Angeles, CA, Port Code 2704. Available at: <http://www.eia.gov/petroleum/imports/companylevel/>.

<sup>42</sup> ND, p. 1-14.

(3/7/13 Revised Application<sup>43</sup>, pdf 42), which would allow handling heavy tar sands crudes.

Lastly, some of the Applicant's recently completed and planned projects to integrate the Carson and Wilmington Operations are required to facilitate the refining of increased amounts of heavy sour crudes, such as tar sands, at the Wilmington Operations. The hydrogen plant at Wilmington, for example, was recommissioned to produce 15 MMSCF/day of hydrogen. This removed constraints for the hydrocracker and hydrotreaters at both facilities, allowing them to refine increased amounts of heavy crudes, such as tar sands. The Wilmington sulfur recovery unit was "debottlenecked", increasing its capacity by 10 ton/day. This increased capacity would be required to run significant amounts of high sulfur tar sands crudes. A blending system was also installed at Carson to mix light and heavy crudes to eliminate metallurgy (e.g., corrosion due to high TAN tar sands crudes) or yield constraints (e.g., reductions in yield due to system design).<sup>44</sup> All of these projects at the Los Angeles Refinery, and especially the Wilmington Operations, allow the Refinery to process increased amounts of tar sands crudes. Thus, the Project in conjunction with Carson integration projects, that have been completed or are proposed, would allow a significant increase in the amount of tar sands that could be refined.

Tar sands crudes would face stronger opposition in California than Bakken due to the well-known environmental impacts from producing and refining them.<sup>45</sup> Thus, they are frequently disguised in project proposals by referring only to broad general classes of crudes, e.g., light and heavy.

As tar sands crudes cannot be eliminated, the Neg. Dec. should have identified them and disclosed the environmental impacts that would be associated with refining them.<sup>46</sup> While a small amount of these crudes were run in the baseline, the Project would allow a substantial increase in these crudes due to increased storage capacity at the Tank Farm to be received at the Marine Terminal from the Vancouver Terminal.

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<sup>43</sup> Tesoro, Revisions for Application for Permit to Construct AQMD Application Nos. 545646 & 545745 Tank No. 300035 and Tank No. 300036, March 7, 2013 (3/7/13 Revised Application).

<sup>44</sup> 12/10/13 Tesoro, pp. 10, 29 and Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff remarks on California synergies at 9:27 to 10:13 minutes, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

<sup>45</sup> EIP, Tar Sands: Feeding U.S. Refinery Expansions with Dirty Fuel, June 2008, Available at: [http://environmentalintegrity.org/pdf/publications/Tar\\_Sand\\_Report.pdf](http://environmentalintegrity.org/pdf/publications/Tar_Sand_Report.pdf).

<sup>46</sup> EIP, Tar Sands: Feeding U.S. Refinery Expansions with Dirty Fuel, June 2008, Available at: [http://environmentalintegrity.org/pdf/publications/Tar\\_Sand\\_Report.pdf](http://environmentalintegrity.org/pdf/publications/Tar_Sand_Report.pdf).

3. *The Los Angeles Refinery Is Not Currently Running Bakken*

The above analysis indicates that one purpose of the Project is to facilitate a switch to cost-advantaged crudes, most likely Bakken or tar sands crudes. The Neg.Dec. asserts that the Project would not change "types" of crude oils delivered to the Wilmington Operations. (The Project could deliver crude oil to either refinery, as discussed elsewhere in these Comments). Further, publicly available information reviewed below indicates that neither Wilmington nor Carson currently process significant amounts of North American cost-advantaged crudes, such as Bakken.

In its 10-Q reports to the U.S. Securities & Exchange Commission, Tesoro reported that only its Alaska, North Dakota, and Washington refineries were running Bakken crude:

- For the quarter ended September 30, 2012: "We supply our North Dakota refinery exclusively with Bakken crude oil and our Washington refinery with Canadian Light Sweet crude oil."<sup>47</sup>
- For the quarter ending March 31, 2013: "We supply our North Dakota refinery exclusively with Bakken crude oil, our Washington refinery primarily with Canadian Light Sweet and Bakken crude oil and our Utah refinery with light sweet crude oil from Wyoming and Montana as well as Uinta Basin waxy crude oil... **Our California refineries run a significant amount of South American heavy crude oil and San Joaquin Valley Heavy ("SJVH"), which continued to be priced at a discount to Brent during the first quarter of 2013.** During the first quarter of 2013, we supplied our Alaska refinery primarily with Alaska North Slope crude oil ("ANS")."<sup>48</sup>
- For the quarter ending March 31, 2014: "We supplied our North Dakota refinery exclusively with Bakken crude oil, our Washington refinery primarily with Bakken and Canadian Light Sweet crude oil and our Utah refinery with light sweet crude oil from Wyoming and Colorado as well as Uinta Basin waxy crude oil...**Our California refineries run a significant amount of South American**

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<sup>48</sup> U.S. Securities and Exchange Commission, Tesoro Corporation Form 10-Q, For the Quarterly Period Ended March 31, 2013, p. 33. Available at <https://www.sec.gov/Archives/edgar/data/50104/000005010413000029/a2013331-tsox10q.htm>, emphasis added.

heavy crude oil ("Oriente") and San Joaquin Valley Heavy () and light crude oil from Iran ("Basrah").<sup>49</sup>

Thus, the 10-Q reports suggest that Tesoro was not refining significant amounts of Bakken in its California refineries in 2012 and 2013 and that Tesoro is not currently refining significant amounts of Bakken at its California refineries.

The CEO of Tesoro, Greg Goff, stated that Tesoro shipped 5,000 to 7,000 bbl/day of Bakken into California in the first quarter of 2014 and the Bakken supply is limited to 10,000 bbl/day due to logistic constraints.<sup>50</sup> These numbers are consistent with known rail imports of Bakken to Tesoro's Martinez refinery,<sup>51</sup> and further indicate the Los Angeles Refinery is not currently, nor has it historically refined Bakken crudes.

Tesoro's own statements in its first quarter 2014 earnings call further indicate that Bakken does not constitute the baseline crude slate for the Wilmington Operations. In particular, Mr. Goff stated that the crude slate of the Los Angeles Refinery has not changed materially since the acquisition of Carson and is largely ASN and Basrah. He confirmed that the crude slate will change in the future and the Vancouver Terminal is the "primary way that we want to be able to improve crude supply cost at the Los Angeles facility."<sup>52</sup>

The Marine Terminal Agreement, Annex D, lists crudes that could be accepted at the Marine Terminal in the baseline, prior to 2013. These do not include Bakken crude or any crude with a vapor pressure as high as Bakken.<sup>53</sup> In fact, this Agreement stipulates a Reid Vapor Pressure limit of 6 psi or less for crudes imported at the Marine

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<sup>49</sup> U.S. Securities and Exchange Commission, Tesoro Corporation Form 10-Q, For the Quarterly Period Ended March 31, 2014, p. 28. Available at: <https://www.sec.gov/Archives/edgar/data/50104/000005010414000024/tso10q-20140331.htm>, emphasis added.

<sup>50</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff response to Barclay questions at 28:10 - 28:47 min, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en> and transcript attached as Exhibit D.

<sup>51</sup> Q3 2013 Tesoro Corporation Earnings Conference Call, November 7, 2013 Transcript, George Goff statements at p. 4 ("We also started taking up to 3 unit trains a month of Bakken crude oil into our Martinez refinery...we have the capacity to deliver nearly 350,000 barrels per month of Bakken crude oil into our Martinez, California refinery.") and 11 ("...what we said was we can deliver three unit trains per month into the Martinez or Golden Eagle refinery as well as some additional manifest cars that we do, which allows us to maximize the use of the facilities. As a result of that, it's 350,000 barrels per month at the present time.), Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-transcriptsarchive>.

<sup>52</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff response to Barclay questions at 28:54 - 30:19 min, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

<sup>53</sup> Marine Terminal Agreement, Sec. 7.0.

Terminal, which excludes the much higher RVP Bakken crudes. This Agreement was amended in December 2013 to eliminate all restrictions.<sup>54</sup>

Further indicating that Bakken is currently not processed at the Refinery, none of the tanks at the Wilmington Operations that are currently permitted to store crude oils have a vapor pressure limit as high as proposed here, a true vapor pressure of 11 psi (which corresponds to a RVP of about 12 psi). The only tanks (e.g., D1078) with a vapor pressure limit of 11 psi RVP store alkylate, a gasoline blendstock.<sup>55</sup>

One of the characteristics of Bakken crudes, as discussed elsewhere in these Comments, is a very high vapor pressure, similar to gasoline. TSBC 2013.<sup>56</sup> The only non-Bakken light crude identified as a feedstock to Tesoro's California refineries reported in its Form 10-Q reports is Basrah, which has a RVP of 3 (Figure 3) to 6 psi. While it is possible that small amounts of Bakken (and tar sands) has been imported to Wilmington via Anacortes<sup>57</sup> or by manifest rail car, a method admitted to have been used for a cost-advantaged, tight shale, mid-continent Permian crude,<sup>58</sup> this is unlikely to have occurred in large amounts as none of the crude oil tanks are permitted to handle high vapor pressure Bakken crudes. Further, it is unlikely that these crudes would have been imported in significant amounts prior to 2012 as transportation out of their area of origin was constrained due to lack of pipeline and rail terminals.

<sup>54</sup> Amended and Restated Long Beach Berth Access, Use and Throughput Agreement, December 6, 2013, Available at:

<http://www.sec.gov/Archives/edgar/data/50104/000119312513465459/d638208dex109.htm>.

<sup>55</sup> The SCAQMD did not produce the most current version of the Wilmington Title V Permit in time to incorporate into these Comments. The produced version was not searchable. Thus, this statement is based on the only version that was available on the web, which is: Wilmington Refinery Title V Permit, August 12, 2012, Available at:

[http://yosemite.epa.gov/R9/AIR/EPSS.NSF/6924c72c5ea10d5e882561b100685e04/abda60d38b6b117e8825777e005c93f3/\\$FILE/ID%20800436%20Tesoro%20Refining%20Marketing%20Co-Wilmington%20Refinery%20-Final%20Revised%20Title%20V%20Permit%20AN%20502823%20470259%20502824.pdf](http://yosemite.epa.gov/R9/AIR/EPSS.NSF/6924c72c5ea10d5e882561b100685e04/abda60d38b6b117e8825777e005c93f3/$FILE/ID%20800436%20Tesoro%20Refining%20Marketing%20Co-Wilmington%20Refinery%20-Final%20Revised%20Title%20V%20Permit%20AN%20502823%20470259%20502824.pdf).

<sup>56</sup> Transportation Safety Board of Canada, TSB Laboratory Report LP148/2013 (TSBC 2013), Available at:

<http://www.tsb.gc.ca/eng/enquetes-investigations/rail/2013/R13D0054/lab/20140306/LP1482013.asp> Enbridge Pipelines Inc., 2013 Crude Characteristics (U.S. High Sweet - Clearbrook and Lewiston are Bakken crudes), Available at:

<http://www.enbridge.com/~media/www/Site%20Documents/Delivering%20Energy/2013%20Crude%20Characteristics.pdf>.

<sup>57</sup> Kristen Hays, UPDATE 2 - Tesoro Lifts Volumes of Bakken Rail Project, August 2, 2012, Reuters (CEO Goff of Tesoro is quoted as saying: Tesoro "may consider moving crude oil to California" once the Anacortes rail operation is running smoothly at 50,000 bpd.) Available at:

<http://www.reuters.com/article/2012/08/02/tesoro-bakken-idUSL2E8J276M20120802>.

<sup>58</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff response to questions from Barclays at 27:26 to 27:48 min, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

**B. The Neg.Dec. Fails to Analyze the Environmental Impacts of a Crude Switch**

A switch from the current crude slate, which is primarily California heavy crude, ANS, and foreign imports, to a crude slate that replaces ANS and foreign imports with Bakken, increased amounts of tar sands, or other similar cost-advantaged North American crudes, results in two categories of changes to the Los Angeles Refinery that were not disclosed in the Neg.Dec. First, the physical and chemical characteristics of these new crudes are very different from the crudes they would replace. These differences will result in significant environmental impacts not considered in the Neg.Dec. Second, the Los Angeles Refinery may have to be modified to accommodate the changes in crude slate. These changes would result in additional environmental impacts that were not considered in the Neg.Dec.

1. *Unique Chemical and Physical Composition Will Result in Significant Environmental Impacts*

The foreseeable switch from ANS and foreign imports to very light Bakken or larger amounts of tar sands crudes as a result of the Project, described in the above sections, is a feedstock change that should have been identified in the Neg.Dec. The new crudes, facilitated by the Project, are chemically and physically different from the current crude slate. These differences will result in significant impacts not disclosed in the Neg.Dec.

*a. Bakken Crudes:*

Bakken crudes have unique chemical and physical characteristics that distinguish them from currently refined crudes and which would result in significant environmental impacts not identified in the Neg.Dec., including significant risk of upset, air quality, and public health impacts. These unique characteristics include high volatility, flammability,<sup>59</sup> and elevated concentrations of TACs and VOCs. The basis of my conclusion is laid out below as each of the impacts is discussed. See Figure 1 and the composition data for acceptable crudes in the Marine Terminal Agreement, Annex D compared to Bakken composition data reported in the Transportation Safety Board of Canada's analyses. TSBC 2013.

Light crude oils are not unique and have been common since the advent of petroleum production. Bakken and other light crude oils taken straight from the well typically contain large amounts of natural gas liquids (NGLs), known as light ends.

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<sup>59</sup> Flammable crude oils will ignite when they are mixed with air in certain concentration ranges. The lowest temperature at which they produce sufficient vapor to support combustion is called the "flash point".



These include C2 to C5 hydrocarbons -- methane, propane, butane, ethane, and pentane. These are the components most likely to volatilize, burn, or explode when sparks fly in an accident. These light ends have the effect of increasing a crude's vapor pressure, lowering its flash point and lowering its initial boiling point, all of which result in increased environmental risks. These are called "live" crude oils. The high concentration of light ends makes them highly flammable, more likely to form fire balls and BLEVES in accidents. The failure to recognize this resulted in a significant underestimate of hazards in the Neg.Dec.

However, in most petroleum-producing regions, light ends are removed before they are shipped using a stabilizer -- a tall, cylindrical tower that uses heat to separate the light ends, which are then condensed and sent to a fractionator for processing. Crude stabilizers and NGL pipelines to send the recovered NGLs to market are ubiquitous in oil fields that produce light crude oils as crude pipeline specifications set pressure limits that force stripping of the NGLs. However, in the Bakken fields, this infrastructure is rare and most Bakken crude that is shipped by rail is shipped live. This distinguishes it from other light crudes, which are shipped dry, e.g., Eagle Ford crudes in Texas.<sup>60</sup>

Medium-heavy to heavy crudes, on the other hand, such as those from California and Alaska that the Bakken would replace, are hard to ignite because they do not have any combustible light ends. Most light crudes, including the imported foreign crudes currently processed at the Los Angeles Refinery, are stabilized. These stabilized or "dead" crudes will not actively boil at ambient temperature and can be safely shipped, stored, and refined. Thus, while "light" may replace "light", there are major differences in composition that affect environmental impacts. The Neg.Dec. does not impose any condition(s) that require that NGLs be removed from received crudes. Thus, analyses must assume that they will be present.

In addition, Bakken crudes, when blended with heavy crudes to meet crude slate requirements, have resulted in many refinery operating issues, which increase emissions. These include fouling of the cold preheat train; desalter upsets; and fouling of hot preheater exchangers and furnaces; as well as corrosion.<sup>61</sup> These operating problems increase emissions.

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<sup>60</sup> 'Degassing' North Dakota Crude Oil Before Shipping Among Safety Ideas, Insurance Journal, May 14, 2014, Available at: <http://www.insurancejournal.com/news/national/2014/05/14/329095.htm>.

<sup>61</sup> Innovative Solutions for Processing Shale Oils, Hydrocarbon Processing, 7/10/2013, <http://www.hydrocarbonprocessing.com/Article/3223989/Innovative-solutions-for-processing-shale-oils.html>.

*b. Tar Sands Crudes:*

The impacts of refining a larger fraction of tar sands crudes than in the current slate would also result in significant environmental impacts including: (1) adverse odor impacts from higher levels of mercaptans and other odiferous sulfur compounds; (2) increased combustion emissions from all fired sources in the refinery; (3) increased potential for accidental releases from corrosion due to high Total Acid Numbers; (5) higher greenhouse gas emissions;<sup>62</sup> (5) higher hydrogen demand, requiring possible expansion of Hydrogen Plant capacity; (6) refinery operational problems that increase startup, shutdown, malfunction and other emissions,<sup>63</sup> among others. These are discussed in more detail in comments that I prepared on the Santa Maria Rail Spur Project, attached to these Comments as Exhibit F.

2. *The Neg.Dec Failed to Identify and Analyze Foreseeable Refinery Modifications Required to Refine Bakken or Other Cost-Advantaged Crudes*

Replacing a significant portion of the current crude slate with Bakken, tar sands, and other cost advantaged crudes requires modifications in the Los Angeles Refinery that will result in significant environmental impacts that were not disclosed in the Neg.Dec. A refiner's choice of crude oil is influenced by the specific collection of processing units at the refinery and their design. Refinery configurations are unique and are typically designed to process a specific crude slate. A refinery's design is matched to the crude slate with the goal of maximizing more valuable light products such as gasoline and diesel.

In the Project baseline, the Wilmington and Carson refineries were full-conversion coking refineries<sup>64</sup>, designed to maximize the yield of more valuable light products from the heaviest fraction of the crude oil barrel, present in large amounts in its current crude slate.

<sup>62</sup> Greg Karras, Combustion Emissions from Refining Lower Quality Oil: What is the Global Warming Potential?, *Environmental Science & Technology*, v. 33, 2010, pp. 9584-9589. Available at: <http://pubs.acs.org/doi/pdf/10.1021/es1019965>; International Council on Clean Transportation. *Effects of Possible Changes in Crude Oil Slate on the U.S. Refining Sector's CO2 Emissions*, Final Report, March 29, 2013. Available at: [http://www.theicct.org/sites/default/files/publications/ICCT\\_Refinery\\_GHG\\_Study\\_Proj\\_Report\\_Apr\\_2013.pdf](http://www.theicct.org/sites/default/files/publications/ICCT_Refinery_GHG_Study_Proj_Report_Apr_2013.pdf).

<sup>63</sup> Oil and Gas Journal, Special Report: Refiners Processing Heavy Crudes Can Experience Crude Distillation Problems, 11/18/2002. Available at <http://www.ogj.com/articles/print/volume-100/issue-47/special-report/special-report-refiners-processing-heavy-crudes-can-experience-crude-distillation-problems.html>

<sup>64</sup> ND, Fig. 1-4.

A coking refinery that processes heavy sour crude oils such as Wilmington and Carson has the majority of its hardware (and capital investment) designed to handle the bottom or heavy portion of a crude barrel. These refineries are designed specifically to convert the full barrel of heavy crude oil into high-value finished products such as gasoline and diesel. Thus, when they switch from a heavy crude slate to a lighter one, such as the possible switch from the current slate to a larger fraction of light sweet crude such as Bakken (Fig. 2), they have too much processing capacity at the bottom of the barrel and not enough at the top of the barrel. This leads to operational inefficiencies, higher costs, and financial penalties. Further, light crudes such as Bakken yield larger amounts of liquefied petroleum gas (LPG) and naphtha and lower amounts of distillate than crudes they would replace. This runs counter to demand growth patterns.<sup>65</sup> These inefficiencies drive modifications of the refinery to increase processing capacity for the top of the barrel.<sup>66</sup>

The Neg.Dec. failed to describe the baseline refinery with sufficient specificity to identify the changes that would be required (some have already been made) to respond to the change in crude slate facilitated by this Project. However, in general, coking refineries such as Wilmington and Carson are not configured to process large amounts of lighter crudes due to crude distillation column limitations, overhead cooling issues, light ends recovery capacity, naphtha handling capability, and other constraints that must be addressed to efficiently process these crudes. Impacted units include crude and vacuum units, gas plants, debutanizers, naphtha units and sulfur plants.<sup>67</sup> These modifications should have been evaluated in the Neg.Dec. along with the crude switch discussed above.

In fact, Tesoro has been modifying its Los Angeles Refinery in anticipation of refining cost-advantaged crudes, such as Bakken and tar sands, whose import would be facilitated by this Project. The Project is part of a facility-wide plan to remove feedstock constraints to facilitate the shift in crude slate to include a much larger fraction of light Bakken crude, tar sands, and other cost-advantaged crudes.

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<sup>65</sup> John R. Auers, *Changing North American Crude Market: Implications, Challenges and Opportunities*, April 24, 2014, p. 25, Available at: <http://www.turnermason.com/wp-content/uploads/2014/05/Changing-North-American-Crude-Markets.pdf>.

<sup>66</sup> IHS Energy/IHS Economics Report, *US Crude Oil Export Decision. Assessing the Impact of the Export Ban and Free Trade on the US Economy*, May 2014, Sec. III (pp. III-4 to III-5) Available at: <http://www.ihs.com/info/0514/crude-oil.aspx>.

<sup>67</sup> John R. Auers, *The North American Crude Boom: How Changing Quality Will Impact Refiners*, March 1, 2013, Available at: <http://www.turnermason.com/wp-content/uploads/2013/05/North-American-Crude-Boom-platt-2013.pdf>.

Some of the changes required to process a larger amount of lighter crudes have already been made or will be made as part of the on-going Carson integration project.<sup>68</sup> These include debottlenecking the hydrocrackers and hydrotreaters and installing a crude blending system.<sup>69</sup> Mr. Goff explained that: "The processing projects focus on removing feedstock constraints; fully utilizing the assets; improving our conversion capabilities, and subsequently our yield...we acknowledge the substitution or partial shift in our crude slate from ANS and other lower-value feedstocks to more attractive alternatives, such as Mid-Continent North American advantaged feedstocks."<sup>70</sup> These modifications have been characterized by Tesoro as improving "crude flexibility", which means modifying operations to allow refining cost-advantaged crudes.<sup>71</sup> They also would result in increasing crude throughput, relative to the baseline operations.

These modifications are required to allow the Los Angeles Refinery to process the lighter crude slate facilitated by the Project. The imports from the Marine Terminal can be routed throughout the Los Angeles Refinery as the integration of the Carson and Wilmington refinery linked these facilities with the Marine Terminal. Tesoro explained in its December 10, 2013 Analyst and Investor Presentation that "[t]he logistics investments physically link the two refineries together, as well as those refineries to our Marine and product terminals. Examples include the pipeline installations between the two plants that allow us to efficiently transfer intermediates between the two refineries..." In its most recent earnings call, Tesoro announced a series of additional modifications at its Los Angeles Refinery to improve crude flexibility, i.e., changes in crude slate in response to market conditions.<sup>72</sup>

Based on these completed and planned modifications, Tesoro has announced that Carson will likely process up to 100,000 bbl/day of Bakken crude.<sup>73</sup> and Wilmington will process heavier cost-advantaged crudes, such as tar sands. The President and CEO of Tesoro Corp., Greg Goff, stated in the third quarter 2013 earnings conference call that "...we have the capability to run additional Bakken crude oils, probably with the exception of the Wilmington part of the Los Angeles refinery. Now, that we combined the two facilities into one, that is a heavy crude processing refinery..."<sup>74</sup> The modifications completed to date indicate Wilmington would likely

<sup>68</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014, Goff remarks on California synergies at 9:27 to 10:13 minutes, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

<sup>69</sup> 12/10/13 Tesoro Analyst & Investor Presentation, p. 10, 29.

<sup>70</sup> 12/10/13 Tesoro Analyst & Investor Presentation, pp. 10, 22.

<sup>71</sup> 12/10/13 Tesoro Analyst & Investor Presentation, p. 32.

<sup>72</sup> Q1 2014 Tesoro Corporation Earnings Conference Call, May 1, 2014 (Q1 2014 Tesoro Earnings Call), Goff remarks on California synergies at 9:27 to 10:13 minutes, Webcast available at: <http://edge.media-server.com/m/p/th8e4nzb/lan/en>.

<sup>73</sup> 12/10/13 Tesoro Analyst & Investor Presentation, pp. 10, 22.

<sup>74</sup> Q3 Tesoro Corporation Earnings Conference Call, November 7, 2013 (Q3 Tesoro Earnings Call), p. 17, Transcript available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-transcriptsarchive>.

process tar sands crude. Tesoro, for example, replaced a vacuum distillation unit at the Wilmington facility to allow it to upgrade heavy ends to clean products.<sup>75</sup> This is consistent with setting up Wilmington to process tar sands, rather than Bakken.

Thus, the statement in the Neg.Dec. that “no [Project-related] modifications will occur at the Carson Operations” is not correct.<sup>76</sup> Modifications have been made and additional modifications are planned to allow Carson to process a lighter slate with a significant fraction of Bakken crudes, imported through the Marine Terminal via two new 300,000 bbl floating roof storage tanks, permitted specifically to store the much lighter Bakken crude to be accommodated by the Project.

The modifications that have been made and that are planned to allow the Los Angeles Refinery to process cost-advantaged crudes will result in increases in air emissions, hazards, and public health risks that were not disclosed in the Neg.Dec. There will be emissions, for example, from the new blending facility required to blend these new crudes into the slate; emissions from the newly started up hydrogen plant; and increases in emissions from fugitive components throughout the refinery that handle these new crudes, etc.

#### **C. The Tank Farm and Marine Terminal Throughputs Would Increase**

The Neg.Dec. frames the Project as increasing the rate of crude oil unloading from ships while not increasing the frequency of ship deliveries.<sup>77</sup> However, the Neg.Dec. incorrectly claims that the increased unloading rate would not lead to an increase in throughput of the Marine Terminal and Tank Farm and would lead to a decrease in ship emissions from decreased unloading time.<sup>78</sup>

Increased ship unloading efficiency does not exclude the possibility of unloading a greater proportion of bigger ships, as compared to baseline operations, or even unloading ships on more days. Simply put, if ships can be unloaded faster, more or larger ships can be unloaded, increasing imports and exports. Other parts of the Project are designed to increase throughput. The Neg.Dec. fails to identify the fairly obvious larger goal of the Project, which is to increase the throughput of the Tank Farm and the Marine Terminal.

First, Table 1 shows the tank modifications will increase the throughput of just the tanks modified by the Project from a baseline throughput of 458,121 bbl/mo to

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<sup>75</sup> Tesoro Aims to Increase Throughput of Domestic Crude Over the Next Few Years, Investment Thesis, July 24, 2013, Available at <http://analysisreport.morningstar.com/stock/archive?t=TSO&region=USA&culture=en-US&productcode=MLE&docId=604033>.

<sup>76</sup> ND, p. 1-4.

<sup>77</sup> ND, p. 1-1.

<sup>78</sup> ND, pp. 2-20/21.

3,850,000 bbl/mo. This is a factor of 8 increase, amounting to 3.4 million barrel per month, which would be supplied by an increase in throughput from the Marine Terminal.

Table 1.  
Tank Throughput Increase  
(bbl/mo)

Tank	2010-211 Baseline Throughput <sup>79</sup>	SCAQMD Application	Project Throughput ND, Table 1-1
80038	30,782	Ap. 554668	350,000
80079	350,000	Ap. 556835	500,000
300035	32,276*	Ap. 545646	1,500,000
300036	45,063*	Ap. 545745	1,500,000
<b>Total</b>	<b>458,121</b>		<b>3,850,000</b>

\*Throughput for tanks 80035 & 80036, which were replaced by tanks 300035 and 300036 under the Project.

Second, the Project accommodates the increase in Tank Farm and Marine Terminal throughput by replacing all of the existing 12-inch diameter piping that connects “the new tanks as well as to other tanks throughout the tank farm” with a 42-inch diameter aboveground pipeline.<sup>80</sup> The flow rate through a pipeline is directly proportional to the diameter of the pipe, squared. Thus, increasing the diameter of the pipeline connecting the tanks from 12 inches to 42 inches would allow an increase in throughput of the Tank Farm by a factor of 12.25.<sup>81</sup>

The Neg.Dec. does not include a figure that shows the pipeline layout and pipeline connections between the Los Angeles Refinery, Marine Terminal, and Tank Farm (or the boundaries of the Tank Farm and Marine Terminal). Assuming the Tank Farm is linked by pipeline with the Marine Terminal, as implied by Neg.Dec. Figure 1-5, this new pipeline would also debottleneck flow between the Marine Terminal and the Tank Farm, as the existing pipeline through the Marine Terminal is 24-inch diameter

<sup>79</sup> For Tank 80038, Ap. 554668: 2010 at pdf 42 (33,598.22 bbl/mo) and 2011 at pdf 44 (27,966.04 bbl/mo). For Tank 80079: Ap. 556835. This tank was out of service in 2010 to retrofit an internal floating roof (pdf 30). Thus, 2010 throughput is not representative of normal operation. The throughput reported in Table 1 is the permit limit, which is higher than actual 2011 throughput of (158,278 bbl/mo at pdf 36.) For Tanks 300035/36: Ap. Tank 80035 2010-2011 baseline throughput reported as 32,276 bbl/mo (pdf 52) and Tank 80036 2010-2011 baseline throughput reported as 45,063 bbl/mo (pdf 74).

<sup>80</sup> ND, pp. 1-4, B-3.

<sup>81</sup> The increase in flow rate in the new pipeline:  $Q=(\pi/4)D^2V$ . Thus, the increase in Q, all else held constant, would be  $42^2/12^2 = 12.25$ .

(with a greater throughput capacity than the existing 12-inch<sup>82</sup> diameter Tank Farm piping). This would allow throughput increases at both facilities.

Third, the Neg.Dec. fails to disclose what the new pipeline connects with on each end. This is critical information, required to assess the throughput impacts of the new pipeline. The figure that locates the pipeline<sup>83</sup> shows it extending a significant distance beyond tanks involved in the Project and exiting the Wilmington Operations at the northeast corner. Where does this pipeline go? The facilities adjacent to this northeast boundary include rail lines and a tank farm that is part of the Phillips 66 refinery. Will the pipeline facilitate imports to the adjacent Phillips 66 refinery or imports to the Wilmington Operations from Phillips 66?

The Neg.Dec. fails entirely to address impacts related to the throughput increases at the Tank Farm and Marine Terminal. The throughput increases allow for a dramatic increase in the shipment of cost-advantaged crudes from the Marine Terminal to the Tank Farm and on to Tesoro's Los Angeles Refinery, and from the Tank Farm to the Marine Terminal for export of finished products.

The Neg. Dec. also fails to address additional pipeline modifications related to the throughput increases at both the Tank Farm and Marine Terminal that are reflected in the Applicant's revised SCAQMD application, dated March 7, 2013 and other Project materials in the District's possession. In particular, the revised SCAQMD application states: "The existing 24" crude receiving pipeline will remain [presumably in the Marine Terminal]. The existing 8" pipeline extending across the length of the refinery to the new tanks will be replaced with 24" pipeline."<sup>84</sup> The District's Project file further notes: "24" pipeline replacing 8" pipeline through - Port - Refinery (24") existing Marine Terminal Refinery 8" → 24" (replacement)."<sup>85</sup> Thus, in addition to replacing piping within the Tank Farm, the Applicant is also proposing to replace piping "along the length of the refinery."

The modifications described in the March 7, 2013 application are consistent with Tesoro's public representations. Tesoro explained in its December 10, 2013 Analyst and Investor Presentation that "[t]he logistics investments physically link the two refineries together, as well as those refineries to our Marine and product terminals."

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<sup>82</sup> The Neg.Dec., p. 1-14, states the Tank Farm pipeline is 12-inch, but the SCAQMD file, Ap. 545745, pdf 4, suggests it is 8 inches.

<sup>83</sup> ND, Fig. 1-3.

<sup>84</sup> Tesoro, Revisions for Application for Permit to Construct, AQMD Application Nos. 545646 & 545745, Tank No. 300035 and Tank No. 300036, PRN 545646, March 7, 2013 (3/7/13 Revised Application), pdf 41, emphasis added.

<sup>85</sup> Handwritten notes on the December 18, 2012 "Agenda" for a "kick-off meeting" in the SCAQMD's file #545745.

As the Marine Terminal<sup>86</sup> does not have any throughput limits, the above modifications, which increase the Tank Farm throughput by increasing tank and pipeline throughput, potentially allow the Marine Terminal to realize 100% of its current design capacity of 32,000 bbl/hr. The above modifications, absent any new throughput limits on the Marine Terminal and Tank Farm, provide sufficient excess capacity to allow the Marine Terminal to nearly double its baseline throughput, from 32,000 bbl/hr to 61,250 bbl/hr ( $12.25 \times 5,000 = 61,250$  bbl/hr) once the vapor recovery constraint is removed by the Project and the new Tank Farm pipeline is in place.

I cannot estimate the increase in throughputs as the Project description is incomplete. It, for example, does not identify the 20 tanks in the "Tank Farm," (e.g., all of the figures in the Neg.Dec. show many more than the claimed 20 tanks in the Tank Farm). The Neg.Dec. also does not identify the tanks that would be connected to the new pipeline and their permitted throughputs, the baseline Tank Farm and Marine Terminal throughputs and design capacities, nor the design flow rate of the new pipeline.

Thus, the larger Tank Farm pipeline debottlenecks the entire system. Imports from the Marine Terminal can be routed throughout the Los Angeles Refinery as the integration of the Carson and Wilmington refinery linked these facilities with the Marine Terminal. Thus, debottlenecking the Tank Farm, debottlenecks everything connected to it.

The Project is also related to Tesoro's larger "Southern California Logistics" project which includes opening Tesoro's Southern California terminals to third-party business, and also expanding its Southern California terminals. 1/9/14 Tesoro Presentation, p. 24. The Project facilitates the Southern California Logistics projects by allowing more ship calls at the expanded terminals through the more rapid and efficient unloading of ships.

An increase in Marine Terminal throughput is consistent with public announcements by Tesoro Logistics. Tesoro Logistics has announced it plans to expand the capacity of its marine terminals.<sup>87</sup> In its May 1, 2014 earnings call, Philip Anderson, President of Tesoro Logistics LP stated:

"We have two of our terminals are being expanded (sic) to handle additional capacity, and those expansions will come online this summer. And that will

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<sup>86</sup> Tesoro Logistics Operations LLC Long Beach, 820 Carrack Ave., Long Beach, Facility ID: 172878, September 27, 2013 (Marine Terminal Title V Permit).

<sup>87</sup> Tesoro Logistics, 2012 Citi MLP/Midstream Infrastructure Conference, August 2012, pp. 12-13, Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations>. See also: 1/9/14 Tesoro Presentation, p. 24.



allow us to bump up volumes either very late in the second quarter or early in the third quarter.”<sup>88</sup>

Elsewhere in the same conference call, Mr. Anderson responded to a question from RBC Capital Markets further identifying which terminals would be expanded and by how much:

“Our marine facility down there [referring to its terminals in Long Beach], 121, which is the large neighbor de-berth in Long Beach, stays pretty full. We have our legacy to Long Beach terminal [Marine Terminal] that is adjacent to our newly acquired, what we call, P-2 in Long Beach. And between P-2 and our legacy Long Beach terminal, we probably have an additional 100,000 plus barrels per day of throughput capacity.”<sup>89</sup>

The 100,000 bbl/day of unused throughput capacity is consistent with similar estimates published elsewhere.<sup>90</sup> This analysis reported Berths 76-78 had 43,000 bbl/day and Berths 84-87 59,000 bbl/day of unused capacity for a total of 102,000 bbl/day. Thus, with no physical modifications to the Marine Terminal itself, the Project, by removing the vapor recovery capacity constraint, and increasing the diameter of the connecting pipeline, would allow an increase in currently unused throughput of about 59,000 bbl/day.

More modifications are planned to capture additional throughput increases, allowed by the Project’s increase in tank and pipeline throughput. In its most recent earning call, the President of Tesoro Logistics, Phillip Anderson, stated: “The remainder of the organic growth is focused primarily in our Southern California assets, where we’re expanding a couple of the terminals, and adding additive and blending systems to those terminals to enable some of the higher throughputs that we expect to bring into those terminals over time. Once we have that, we’ll determine the right size of pipes and pumps to put in to enable those volumes and finalize an engineering estimate.”<sup>91</sup> A project is currently pending at the POLB, the Berths 84-87 Tesoro Facility Improvements project.<sup>92</sup> The SCAQMD should address whether these modifications are related to the

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<sup>88</sup> Thomson Reuters Streetevents Edited Transcript, TLLP – Q12014 Tesoro Logistics LP Earnings Conference Call, p. 6, Available at: <http://www.tesorologistics.com/phoenix.zhtml?c=242247&p=irol-calendar>.

<sup>89</sup> Thomson Reuters Streetevents Edited Transcript, TLLP – Q1 2014 Tesoro Logistics LP Earnings Conference Call, May 1, 2014, pp. 6-7.

<sup>90</sup> Pacific L.A. Marine Terminal SEIR/DSEIR, Appx. D1, pp. D1-20/21.

<sup>91</sup> Tesoro Logistics LP Management Discusses Q4 2013 Results – Earnings Call Transcript, February 6, 2014. Available at: <http://seekingalpha.com/article/2001121-tesoro-logistics-lp-management-discusses-q4-2013-results-earnings-call-transcript?page=4&p=qanda&l=last> and transcript attached as Exhibit G

<sup>92</sup> G.J. Cardamonte, Port of Long Beach 2012 Capital Program Update, September 2012, pdf 37 (“Berths 84-87 Tesoro Facility Improvements”), Available at: [http://www.cmaasc.org/pdfs/092012\\_portoflb.pdf](http://www.cmaasc.org/pdfs/092012_portoflb.pdf). See also: <http://www.polb.com/civica/filebank/blobload.asp?BlobID=11974>.

Project.

**A. The Throughput of the Los Angeles Refinery Could Increase**

The Neg.Dec. claims that the Project would not increase “refinery output beyond existing permit limits.” ND, p. B-3. Elsewhere, the Neg.Dec. argues “the refining capacity is currently constrained by factors unrelated to storage capacity (e.g., equipment permit limit conditions, equipment design parameters, market demand, equipment maintenance schedules, and crude oil characteristics).” ND, p. 1-15. However, existing constraints, whatever they may be, are not relevant for the purpose of the District’s analysis if it is reasonably foreseeable that the Applicant plans to eliminate such constraints.

The “Marine Terminal Agreement”<sup>93</sup> indicates a 24-inch diameter crude oil pipeline and a 14-inch diameter diesel/clear VGO pipeline each connects the berths at the Marine Terminal, the Tanks Farm, and the Wilmington Refinery. Thus, it is reasonably foreseeable that increasing the diameter of pipelines that connect tanks within the Tank Farm up to the boundary with the Marine Terminal and Refinery debottlenecks the throughput of crude oil from the Marine Terminal to the Refinery and of diesel and VGO from the Refinery to the Marine Terminal.

Further, Tesoro’s description of the proposed Carson-Wilmington integration project indicates it will increase throughput and finished product output. As noted elsewhere, Mr. Goff explained that: “The processing projects focus on removing feedstock constraints; fully utilizing the assets; improving our conversion capabilities, and subsequently our yield.”<sup>94</sup> “Removing feedstock constraints” means debottlenecking units so that more feedstock can be processed, which increases throughput. “Fully using the assets” implies that bottlenecks will be removed, such as inadequate hydrogen supply, to allow an increase in throughput. Improving “yield” means that more finished products will be produced, which will increase exports through the Marine Terminal. Tesoro Logistics anticipates that it will “[c]apture

<sup>93</sup> Marine Terminal Agreement, p. 1, Recitals: “Customer owns (i) one 24” dark oil pipeline (the “Crude Oil Pipeline”), depicted on Schedule A as Items No. 1, between the Wharf and Customer’s Los Angeles Refinery located in Carson and Los Angeles, California (the “Wilmington Refinery”), (ii) one 16” gasoline pipeline (the “Gasoline Pipeline”), depicted on Schedule A as Item No. 2, between the Wharf and the Wilmington Refinery, and (iii) one 14” diesel/clear VGO pipeline (the “Clear Products Pipeline,” depicted on Schedule A as Item No. 3, between the Wharf and the Wilmington Refinery; and together with the Gasoline Pipeline, the “Refined Products Pipelines”; and collectively, the Refined Products Pipelines and the Crude Oil Pipeline, the “Pipelines”).

<sup>94</sup> 12/10/13 Tesoro Analyst & Investor Presentation, pp. 10, 22.

incremental volumes in the Southern California pipeline system as a result of Tesoro's refining complex integration."<sup>95</sup>

The Neg.Dec. asserts that "Tesoro has operated the refining processes at the Wilmington Operations at the maximum capacity in the past and are expected to continue to operate up to or at maximum capacity in the future" ( ND, p. 1-5) and "[t]he refining processing rates fluctuate and have achieved maximum capacity periodically in the past and are expected to periodically in the future."<sup>96</sup> However, this is the wrong test to determine if the Project will result in an increase in throughput and hence emissions from the Refinery.

The proper baseline to evaluate impacts under CEQA is the average throughput in the 2 years prior to the preparation of the CEQA document. The test is not whether the facility may have hit the maximum occasionally. The test, rather, is based on the annual average over the baseline years. The Neg.Dec.'s Project description is inadequate because it does not contain any Terminal or Refinery throughput information, which is required to determine increases in throughput and resulting environmental impacts. Thus, the Project description is inadequate and does not support the claim that no increase in Refinery throughput will occur. Debottlenecking the pipeline in the Tank Farm could certainly could debottleneck the Refinery itself.

## II. CANCER RISKS ARE SIGNIFICANT

The Neg.Dec. discloses an increase in volatile organic compound (VOC) emissions of 84.1 lb/day, relative to baseline emissions.<sup>97</sup> These VOCs contain various TACs. Thus, a health risk analysis (HRA) was prepared to evaluate the increase in cancer and noncancer acute and chronic health risks.<sup>98</sup> This analysis concluded that Project health risks are not significant. I disagree with this conclusion.

The Neg.Dec. estimated that Project operational emissions would result in incremental cancer risks of 0.32 excess cancer cases per one million at the maximum exposed individual resident (MEIR), located 300 meters (984 ft) west of the Wilmington Operations boundary. Because the modeled cancer risk is below the SCAQMD's significance threshold of 10 in one million, the Neg.Dec. concluded that cancer health risks due to the Project would be less than significant.<sup>99</sup> However, the Neg.Dec.'s

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<sup>95</sup> Tesoro Logistics, National Association of Publicly Traded Partnerships MLP Investor Conference (NAPTP) Conference, May 2014, p. 14, Available at: <http://www.tesorologistics.com/phoenix.zhtml?c=242247&p=irol-calendar>.

<sup>96</sup> ND, p. 2-18.

<sup>97</sup> ND, Table 2-5.

<sup>98</sup> ND, pp. 2-24 to 2-27 & Appx. B.

<sup>99</sup> ND, p. 2-25.

methodology for assessing cancer risks is flawed and fails to identify significant impacts.

The HRA underestimated TAC emissions, did not evaluate the entire Project, and failed to analyze early-in-life exposure to cancer risks. When these errors and omissions are corrected, the cancer risk increases to 16.8 in one million, which exceeds the District's 10 in one million significance threshold and is a significant health impact.

**A. The HRA Used the Wrong TAC Emission Speciation Profile**

The Project TAC emissions would be released when transporting, storing and moving crude oils and other petroleum products into and out of tanks and associated equipment, such as connectors and valves. A "speciation profile" for a petroleum product identifies each chemical in the liquid and its concentration, reported as volume or weight percent. A speciation profile for a crude oil with a RVP of 10.5 psi, for example, is shown in Appendix A at page A-17, and also in Appendix B at page B-22.

The speciation profile used to estimate health impacts in the Neg. Dec. is based on "a hybrid liquid speciation of commodities that could be stored in the tanks. This hybrid liquid speciation was created by selecting the maximum amount of TACs present in each speciation of petroleum product that would be stored in each of the tanks and combining them into one speciation."<sup>100</sup> The resulting speciation profile is reported in the Neg.Dec., p. B-22. However, the resulting speciation profile is entirely hypothetical. The speciation profile for each commodity that was considered in selecting the maxima and supporting test data was not provided nor cited to a traceable source.

The Neg.Dec. asserts that "[t]he proposed project does not change the types of crude oils or feedstocks delivered to or processed at the Wilmington Operations. Therefore, the crude oil speciation used for existing operations is appropriate to represent the crude oil to be stored in the proposed storage tanks."<sup>101</sup> The conclusion that the hypothetical speciation profile used in the Neg.Dec. is appropriate to evaluate Project impacts is unsupported. The Neg.Dec. does not identify the baseline crude slate or any of the materials imported, transported, or stored in Project facilities. In addition, the assumption in the Neg.Dec. that there would be no change in baseline crude slate is contradicted by the Neg.Dec. and the Project application materials.

As described above, the higher vapor pressure limits (up to 11 psi) on the proposed new and modified tanks and aspects of tank design (heating coils) indicate that the Project would facilitate a crude switch, to light Bakken crude oils and heavy

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<sup>100</sup> ND, p. 2-24.

<sup>101</sup> ND, p. 2-4.

sour tar sands crude oils. These have different chemical characteristics than baseline materials stored at the Tank Farm. See discussion elsewhere in the Comments.

My review of the HRA speciation profile indicates that it is not based on the maximum of each TAC found in the crude oils and other materials that could be stored in the tanks. Material Safety Data Sheets (MSDSs) submitted by Tesoro in its applications to the SCAQMD for the two new 300,000 bbl tanks (3/7/13 Revised Application, pdf 96 - 115) and revised Tank 80079<sup>102</sup> indicate that much higher concentrations of TACs could be present in the crude oils stored at the Tank Farm during Project operations than assumed in the HRA. Additionally, MSDS's submitted by Tesoro in support of its Vancouver Terminal,<sup>103</sup> which would supply the Marine Terminal, includes many of the same MSDSs attached to the SCAQMD applications. These MSDSs indicate that much higher concentrations of benzene, ethyl benzene, toluene, hexane, and xylene will be present in the materials stored in the subject tanks.

The upper bound values from these MSDSs are summarized in Table 2 and compared with the speciation profile used in the HRA. This table shows that the HRA significantly underestimated all of the TACs for which comparative data are available.

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<sup>102</sup> Tank 80079 Throughput Increase Application, October 3, 2013, PRN 556835 (10/3/13 Application), MSDS for Light Sweet Crude, pdf 12

<sup>103</sup> See Tesoro Savage, Application for Site Certification Agreement, vol. 2, Appendix G: Material Safety Data Sheets, August 29, 2013, Available at: <http://www.efsec.wa.gov/Tesoro%20Savage/Application/EFSEC%202013-01%20Volume%20II%20-%20Appendices/EFSEC%202013-01%20Compiled%20Volume%20II.pdf>.

Table 2.  
Comparison of HRA Speciation Profile  
With Maxima Reported in MSDS(s)  
For the Project and the Applicant's Vancouver Terminal<sup>104</sup>

TAC	Weight Percent	
	HRA Speciation Profile	Maxima MSDS
Benzene	0.209	7
PAH	0.005	NR
Chrysene	1.48	NR
Ethyl Benzene	0.143	7
Hexane	1.749	11
Naphthalene	0.437	NR
Phenol	0.01	NR
Toluene	0.399	7
Xylenes	0.766	7

NR = not reported

Table 1 shows that the risk assessment underestimated the amount of benzene, ethyl benzene, hexane, toluene and xylenes in emissions by factors of 6 (hexane) to 50 (ethyl benzene). I did not find any chemical composition data for either chrysene, or other PAHs in crude oil or other products that would be stored in the subject tanks. However, it is likely that tar sands crudes would have high higher concentrations of these chemicals. These compounds are the major contributor to risk in the Project HRA. Analytical data supporting the assumed chrysene and other PAH content should be provided to support these estimates.

I revised the HRA to use the maximum TAC concentrations, summarized in Table 1, based on crudes that would be stored in the subject tanks, as described in the Applicant's application materials for this Project. These calculations are summarized in Table 3, which shows that using the maximum reported values doubles the cancer risk from 0.3 in one million to 0.6 in one million.

<sup>104</sup> Tesoro Savage, Application for Site Certification Agreement, vol. 2, Appendix G: Material Safety Data Sheets for Enbridge Bakken (n-hexane = 11%); sour heavy crude oil (benzene = 7%; toluene = 7%; ethylbenzene = 7%; xylene = 7%); sweet heavy crude oil (toluene = 7%); light sweet crude oil (benzene = 7%; toluene = 7%; ethylbenzene = 7%; xylene = 7%), August 29, 2013, Available at: <http://www.efsec.wa.gov/Tesoro%20Savage/Application/EFSEC%202013-01%20Volume%2011%20-%20Appendices/EFSEC%202013-01%20Compiled%20Volume%2011.pdf>. See also 3/7/13 Revised Application, pdf 96-115.

Table 3.  
Revised Cancer Risk  
Based on Modified Speciation Profile

TAC	Speciation Profile Weight Percent		Cancer Risk Cases per Million	
	HRA Speciation Profile	Maxima MSDS	HRA Cancer Risk ND, p. B-27	Revised Cancer Risk (Maxima/HRA)
Benzene	0.209	7	0.00831	0.278
PAH	0.005	NR	0.076	0.076
Chrysene	1.48	NR	0.227	0.227
Ethyl Benzene	0.143	7	4.180E-4	0.020
Hexane	1.749	11	0.000	0.000
Naphthalene	0.437	NR	0.007	0.007
Phenol	0.01	NR	0.000	0.000
Toluene	0.399	7	0.000	0.000
Xylenes	0.766	7	0.000	0.000
<b>TOTAL CANCER RISK</b>			<b>0.311</b>	<b>0.609</b>

**B. The HRA Failed to Consider Tank Farm Throughput Increases Caused By the Proposed Pipeline Upgrades**

As discussed elsewhere in these Comments, the Project would replace the existing 12-inch diameter pipeline connecting the Tank Farm with the Marine Terminal and the Refinery with a new 42-inch diameter pipeline. This effectively allows a 12.25 factor increase in both the Tank Farm and also debottlenecks the Marine Terminal throughput, which has a 24-inch diameter pipeline. This increase was not considered in the HRA.

As cancer risk is directly proportional to tank throughput for the entire Tank Farm, the increase in throughput allowed by the larger diameter pipeline would further increase cancer risk. As the Neg.Dec. does not contain any baseline VOC emissions for the balance of the Tank Farm, I estimated a potential lower bound increase in VOC emissions that could result from increasing Tank Farm throughput with the new pipeline. See Comment III.B.5. These calculations indicate a lower bound increase in VOC emissions of a factor of 12.25, relative to the Project VOC increase used to estimate

TACs. Thus, this increases cancer risk, which is directly proportional to VOC emissions, increases from 0.609 cancer cases per one million at the MEIR to at least 7.46 cancer cases ( $0.609 \times 12.25 = 7.46$ ). The increase could be much higher, depending on actual baseline VOC emissions, which are not disclosed in the Neg.Dec. and supporting files.

### C. The HRA Failed To Address Early-in-Life Exposure

The HRA determined the incremental cancer risk at the nearest residence, the MEIR, only for an adult receptor without adjusting for increased risk during the first 16 years of life, during which a large fraction of lifetime (70-year) cancer risk is incurred. To address the higher risk of early-in-life exposure, California's Office of Environmental Health Hazard Assessment (OEHHA) and EPA recommend the use of age-dependent adjustment factors, or age sensitivity factors, to account for the higher risks during early stages of life. Specifically, OEHHA recommends:

In order to address the issue of early-in life exposures, OEHHA has adopted a policy, based on the available scientific data, of weighting cancer risk from exposures from the third trimester to <2 yrs of age by a factor of ten, and exposures from age two to less than sixteen years by a factor of three. In addition to innate sensitivities to some carcinogens, children have greater exposures due to physiological and behavioral factors. As a result, a greater proportion of total lifetime risk is accrued by age 16 with lifetime exposure to a constant air concentration than was previously recognized.<sup>105</sup>

EPA recommends the same age-dependent adjustment factors.<sup>106</sup> Because children may be present at residential locations, age-dependent excess cancer risk must be determined. The results of including age sensitivity factors in a health risk assessment are commonly referred to as "child cancer risk."

I calculated the incremental child cancer risk based on the adult cancer risk of 7.46 in one million for a 70-year exposure as revised above to account for a worst-case speciation profile and debottlenecking of the Tank Farm and Marine Terminal. My calculations are summarized in Table 4.

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<sup>105</sup> OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis, Final, August 2012 (hereafter OEHHA Technical Support Document"), pp. 11-2 (internal citations omitted), Available at: [http://oehha.ca.gov/air/hot\\_spots/pdf/2012tsd/TSDportfolio2012.pdf](http://oehha.ca.gov/air/hot_spots/pdf/2012tsd/TSDportfolio2012.pdf).

<sup>106</sup> EPA, Cancer Risk Calculations, Available at: <http://www.epa.gov/oswer/riskassessment/sghandbook/riskcalcs.htm>.



Table 4.  
Child Cancer Risk  
Accounting for Age Sensitivity Factors

Risk Year	Period (years)	Age Sensitivity Factor	Incremental Child Cancer Risk* (per million)
3rd trimester	0.3	10	0.32
1	1	10	1.07
2-15	14	3	4.48
16-70	55	1	5.86
<b>Σ cancer risk child:</b>			<b>11.73</b>
<b>Exceeds 10 in one million significance threshold?</b>			<b>YES</b>

\* Calculated as: [(adult cancer risk 7.46E-06)/(70 years)] × [(age sensitivity factor) × (period in years)]

As shown in Table 4, excess child cancer risk resulting from emissions associated with the Project are 11.7 in one million. This exceeds the SCAQMD’s significance threshold of 10 in one million, adopted as the significance threshold in the Neg.Dec. ND, p. 2-24. This is a significant impact that the Neg.Dec. fails to identify and, consequently, fails to mitigate.

**D. The TAC Emissions from the Project Tanks Are Underestimated**

The emission calculations in the Neg.Dec., Appendix A, underestimated the VOC emissions from three of the tanks by using a lower vapor pressure than would be allowed by the permit conditions. Correcting this error increases VOC emissions, TAC emissions, and cancer risk by a factor of 1.43. See Comment III.B.2. Thus, the revised cancer risk, considering these higher tank VOC emissions, is 16.8 in one million (11.73 x 1.43 = 16.8). This exceeds the SCAQMD’s significance threshold of 10 in one million. This confirms the significant cancer impact noted above.

The actual cancer risk is higher than estimated here as it does not include other sources of TAC emissions. The Neg.Dec. does not account for all TAC emission sources including Project construction;<sup>107</sup> emissions from the vapor recovery system; increases in ship emissions; and tank roof landing, degassing cleaning, and flashing emissions, among others discussed elsewhere in these Comments.

<sup>107</sup> Off-road construction equipment, diesel-fueled trucks, and diesel-fueled generators emit diesel particulate matter (DPM), which is a potent carcinogen. An HRA should have been conducted for the construction phase of the Project and added to the overall health risk of the Project. See, for example, the recent DEIR for the Carson Revitalization Project Specific Plan. City of Carson, Shell Oil Products US Carson Revitalization Project Specific Plan Environmental Impact Report, Draft EIR, February 2014 (Carson DEIR), Impact 4.12-12B, p. 4.2-55, Available at: [http://ci.carson.ca.us/content/files/pdfs/planning/Shell\\_CRP/Web\\_PDFs/06\\_Sec4-2\\_AirQuality.pdf](http://ci.carson.ca.us/content/files/pdfs/planning/Shell_CRP/Web_PDFs/06_Sec4-2_AirQuality.pdf).

### III. THE PROJECT'S AIR QUALITY IMPACTS ARE SIGNIFICANT

The Neg.Dec. concluded that air quality impacts from Project operational VOC emissions are not significant as emission reduction credits (ERCs) would be used to offset otherwise significant increases in VOC emissions. The conclusion in the Neg.Dec. that Project VOC emissions are insignificant is incorrect. The Neg.Dec. fails to identify significant VOC emissions and the use of ERCs does not reduce Project VOC emissions. Moreover, the VOC emissions disclosed in the Neg.Dec are significantly underestimated and would not be offset by the Applicant's ERCs.

In addition, emissions are underestimated as they exclude important sources of emissions, including from debottlenecking the Tank Farm and Marine Terminal; tank roof landing, degassing, and cleaning emissions; tank flashing emissions; tank water draw emissions; and vapor recovery emissions. Emissions from three of the tanks were underestimated as material vapor pressures were underestimated. Finally, ship emissions would increase as Terminal throughput is debottlenecked. When these errors are corrected, air quality impacts from VOCs, nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter with an aerodynamic diameter less than 10 microns (PM<sub>10</sub>), and particulate matter with an aerodynamic diameter less than 2.5 microns (PM<sub>2.5</sub>) are significant.

#### A. ERCs Do Not Mitigate Significant Emission Increases

The Neg.Dec. estimated a net increase in VOC emissions of 84.1 lb/day from Project operations.<sup>108</sup> This exceeds the SCAQMD significance threshold for VOCs of 55 lb/day and is thus a significant air quality impact. However, the Neg.Dec. concludes that air quality impacts from operational emissions are not significant as the net increase in VOC emissions, relative to the baseline, would be offset under SCAQMD Rule 1303.<sup>109</sup>

Thus, the Neg.Dec. did not evaluate the impacts of these emissions in the vicinity of the facility after the Project is implemented. While the HRA evaluated nine of the chemicals included in these VOCs for health impacts, these nine compounds (Table 2) comprise a very small fraction of the total VOCs. For Tank 80079, 71.7% of the VOCs were not included in the HRA or even identified. For the two new tanks, 94.8% of the VOCs were not included in the HRA or identified. ND, p. A-25 ("unidentified components").

The Neg.Dec. proposes to "offset" the Project's VOC emissions using credits previously earned for reducing emissions (emission reduction credits or ERCs) rather than implementing on-site mitigation measures. Emission increases from the Tank

<sup>108</sup> ND, Table 2-5.

<sup>109</sup> ND, Table 2.5 & pp. 2-21 to 2-22.

Farm's new and modified sources are subject to offset requirements under the federal Nonattainment New Source Review requirements (NSR), implemented by SCAQMD Regulation 1303. Offsets usually rely on emission reductions that have occurred in the past at a different location than the increases they are offsetting. The SCAQMD verifies emission reductions and issues ERCs to the facility owner that reduced emissions. These ERCs can then be purchased by others, such as Tesoro, and used to "offset" emission increases from other facilities in the future. In other words, the emission reductions used to "offset" the Project's VOC emissions occurred at a different place and time than the proposed VOC increases.

Thus, they have no impact on actual emissions today, but rather represent the prevention of a future emission increase and a region-wide "on paper" decrease in allowable emissions. Thus, while ERCs may reduce future allowable emissions, using ERC retirement as mitigation will result in an increase in emissions above baseline levels.

On a common sense level, it is not logical to assume that offsets, which rely on emission reductions that may have occurred decades ago in a different location and with a different chemical makeup, will do anything to counteract contemporary emission increases from petroleum product gases in an air basin plagued with air quality problems. However, we obtained them from SCAQMD as the ERCs are referenced and relied upon in the Neg.Dec.<sup>110</sup> The ERCs (145 lb/day) that Tesoro is proposing to rely on are as follows:

- 25 lb/day, created in Santa Monica in 1990 (AQ012941)
- 20 lb/day, created in Santa Monica in 1990 (AQ012942)
- 16 lb/day, created in Santa Monica in 1990 (AQ012943)
- 7 lb/day, created in Santa Fe Springs in 1998 (AQ012992)
- 37 lb/day, created in Santa Monica in 1990 (AQ007213)
- 20 lbs/day, created in South Gate in 1992 (AQ013813)
- 9 lbs/day, created in South Gate in 1991 (AQ013174)
- 11 lbs/day, created in South Gate in 1991 (AQ013173)

None of these ERCs occur contemporaneously with the Project nor did the emissions reductions occur in or near the neighborhoods affected by the Project. The Neg.Dec. contains no demonstration of a net air quality benefit from using these ERCs, e.g., ozone modeling, nor does it disclose the type of source that generated the ERCs so that chemical speciation can be compared. Rather, this approach would increase the

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<sup>110</sup> Letter from Barbara Radlein, SCAQMD, to Elizabeth Klebaner, ABJC, Re: Request for Additional Referenced Documents in the Draft Negative Declaration for the Tesoro Storage Tank Replacement and Modification Project, May 23, 2012 (5/23/14 Radlein Letter), Response to Item #4: ERCs referenced in Neg.Dec., p. 2-21.

exposure of residents in the vicinity of the Project and regionally in the air basin to unhealthy pollutant levels.

Thus, while offsets might reduce air pollution in California or the general region (depending on where actual reductions took place), and satisfy Rule 1303, they will not mitigate the specific impacts of this Project – localized air pollution impacts in the community where the Project is located. To address specific local impacts, CEQA requires SCAQMD to identify and address all potentially significant Project impacts – and require the Project Applicant to achieve – all feasible emission reductions of localized air pollutants to reduce impacts to a less than significant level.

Because the Project would result in significant VOC emissions, the SCAQMD is required to examine the impact of the increase in localized VOC emissions from the Project on the local community and identify mitigation that is capable of reducing or eliminating these local impacts to below a level of significance. To mitigate the Project’s potentially significant VOC emissions, the SCAQMD should consider feasible mitigation measures such as the use of zero-leak fugitive components, external floating roof tanks with geodesic domes commonly used on tanks that store RVP 11 crude oils, cable-suspended, full-contact floating roofs, or use geodesic domes on existing fixed roof tanks.<sup>111</sup> Further, the proposed internal floating roof tanks are not suitable for unstable liquids, such as “live” Bakken crudes, which can produce enough vapor pressure beneath the floating roof to damage the roof itself or the perimeter seal, causing failure of the floating roof.<sup>112</sup>

**B. The Neg.Dec Underestimates VOC Emissions from the Tank Farm**

*1. Roof Landing, Degassing, and Cleaning Emissions Omitted*

VOC and TAC emissions from the two new storage tanks and modifications to existing tanks were calculated using EPA’s TANKS 4.0.9d model (TANKS).<sup>113</sup> However, this model only estimates rim seal losses, withdrawal losses, deck fitting losses, and deck seam losses. It does not estimate roof landing losses, inspection losses, or flashing losses. Thus, it underestimated tank emissions. These emissions should be estimated and added to other tank emissions.

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<sup>111</sup> See, e.g., Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, September 6, 2013, Draft Negative Declaration (Carson Neg.Dec.), Available at: [https://www.aqmd.gov/CEQA/documents/2013/nonaqmd/Draft ND Phillips 66 Crude Storage.pdf](https://www.aqmd.gov/CEQA/documents/2013/nonaqmd/Draft%20ND%20Phillips%2066%20Crude%20Storage.pdf) and City of Richmond, Chevron Refinery Modernization Project DEIR (Chevron DEIR), Chapter 4.3, pp. 4.3-92, Available at: [http://chevronmodernization.com/wp-content/uploads/2014/03/4.3 Air-Quality.pdf](http://chevronmodernization.com/wp-content/uploads/2014/03/4.3_Air-Quality.pdf).

<sup>112</sup> An Introduction to Aluminum Internal Floating Roofs, Available at: <http://www.caldwelltanks.com/an-introduction-to-aluminum-internal-floating-roofs/>.

<sup>113</sup> ND, Appx. A, pp. A-16 to A-50, TANKS 4.0 Report.

The Project includes two new internal floating roof tanks (300035, 300036) and an increase in throughput of an existing internal floating roof tank (80079). The new tanks can be constructed with a leg-supported or self-supporting roof. The TANKS model input in Appendix A indicates that the roofs are not self supported. See, e.g., pp. A-16, A-22, A-43 (Self Supp. Roof? (y/n) = N).

In floating roof tanks with leg-supported roofs, the roof floats on the surface of the liquid inside the tank and reduces evaporative losses during normal operations. However, when the tank is emptied, the roof sits on the legs and is essentially uncontrolled.

In February 2010, the EPA explained that the TANKS model does not include roof landings, and recommended that they be estimated with the equations in AP-42. In other words, the EPA TANKS model estimates evaporative emissions for normal operations only, *i.e.*, it assumes that the floating tank roof is always floating.<sup>114</sup> However, when a tank is emptied to the point that the roof no longer floats on the liquid but lands on deck legs, evaporative losses occur.

After the floating roof is landed and the liquid level in the tank continues to drop, a vacuum is created which could cause the floating roof to collapse. To prevent damage and to equalize the pressure, a breather vent is actuated. Then, a vapor space is formed between the floating roof and the liquid. The breather vent remains open until the roof is again floated, so whenever the roof is landed, vapor can be lost through this vent.<sup>115</sup>

These losses are called “roof landing losses.”

In addition, “degassing and cleaning losses” occur when tanks are drained and degassed for inspection and/or cleaning. These include both roof landing emissions, complete tank degassing, and emissions from cleaning out accumulated sludge. These emissions are essentially uncontrolled tank emissions.<sup>116</sup>

The tank cleaning emissions could be substantially higher for Bakken crudes than for others. Bakken crudes deposit waxy deposits in pipelines and tanks, which

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<sup>114</sup> EPA, TANKS Software Frequent Questions, Updated February 2010; <http://www.epa.gov/ttnchie1/faq/tanksfaq.html>. (“How can I estimate emissions from roof landing losses in the tanks program? ... In November 2006, Section 7.1 of AP42 was updated with subsection 7.1.3.2.2 Roof Landings. The TANKS program has not been updated with these new algorithms for internal floating roof tanks. It is based on the 1997 version of section 7.1.”).

<sup>115</sup> EPA, AP-42, Chapter 7.1 Organic Liquid Storage Tanks, November 2006; <http://www.epa.gov/ttn/chie1/ap42/ch07/final/c07s01.pdf>.

<sup>116</sup> See EPA guidance on estimating these emissions at: <http://www.epa.gov/ttnchie1/faq/tanksfaq.html#13>.

require more frequent cleaning,<sup>117</sup> and thus higher emissions, than the crudes they would replace. Environmental impacts from chemical dispersants used to control these waxy deposits in tanks and pipelines also should be evaluated.

The EPA recommends methods to estimate emissions from degassing and cleaning and roof landing losses.<sup>118</sup> The method for estimating emissions depends on the construction of the tank, *e.g.*, the flatness of the tank bottom and the position of the withdrawal line (the so-called liquid "heel"). Degassing and cleaning and roof landing losses continue until the tank is refilled to a sufficient level to again float the tank roof. Total VOC emissions from floating roof tanks during a roof landing is the sum of standing idle losses and filling losses. They can be estimated using formulas contained in EPA's *Compilation of Air Pollutant Emission Factors* ("AP-42"), Chapter 7.1, Organic Liquid Storage Tanks, Section 7.1.3.2.2. These emissions are routinely included in emission inventories. They are required to be reported, for example, in Texas.<sup>119</sup> They are also included in the emission inventory for Tesoro's Vancouver Terminal.<sup>120</sup>

To reduce emissions from degassing and cleaning and roof landing losses, the SCAQMD should require the Applicant to modify the design of the two new tanks to include self-supporting roofs or external floating roof tanks, equipped with geodesic domes. The SCAQMD should also require the Applicant to retrofit Tank 80079 with a dome that satisfies BACT standards, thus avoiding the increase in emissions from increased throughput.

The Massachusetts Department of Environmental Protection, for example, requires cable-suspended, full-contact floating roofs as BACT for bulk gasoline storage tanks and specifically prohibits leg-supported floating roofs.<sup>121</sup> A similar project to increase crude storage capacity, recently proposed at the nearby Phillips 66 Los Angeles Carson Refinery, required external floating roof tanks with geodesic domes to store

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<sup>117</sup> Innovative Solutions for Processing Shale Oils, Hydrocarbon Processing, 7/10/2013, <http://www.hydrocarbonprocessing.com/Article/3223989/Innovative-solutions-for-processing-shale-oils.html>.

<sup>118</sup> "How Can I Estimate Emissions from Degassing and Cleaning Operation During a Tank Turnaround? And How Can I Estimate Emissions from Roof Landing Losses in the TANKS Program?", Available at: <http://www.epa.gov/ttnchie1/faq/tanksfaq.html#13>.

<sup>119</sup> Memorandum from Dan Eden, Deputy Director, Office of Permitting, Remediation, and Registration; David C. Schanbacher, Chief Engineer; and John Steib, Deputy Director, Office of Compliance and Enforcement, Re: Air Emissions During Tank Floating Roof Landings, December 5, 2006, Available at: [http://www.tceq.state.tx.us/assets/public/permitting/air/memos/tank\\_landing\\_final.pdf](http://www.tceq.state.tx.us/assets/public/permitting/air/memos/tank_landing_final.pdf).

<sup>120</sup> Tesoro Savage, Application for Site Certification Agreement, Section 5.1.2.1.4, Available at: <http://www.efsec.wa.gov/Tesoro%20Savage/Application/EFSEC%202013-01%20Volume%20I/EFSEC%202013-01%20-%20Compiled%20PDF%20Volume%20I.pdf>.

<sup>121</sup> MassDep, Top Case Best Available Control Technology (BACT) Guidelines for VOC Emitting Sources; <http://www.mass.gov/eea/docs/dep/air/approvals/bactvoc.doc>.

crude oil with an RVP of 11.<sup>122</sup> Similarly, Chevron proposes<sup>123</sup> to use domes on several existing tanks to mitigate VOC emission increases at its Richmond Refinery.<sup>124</sup> The crudes that would be stored in the Project tanks have proposed vapor pressure limitations that are comparable to gasoline (TSBC 2013, Sec. 3.2.7), justifying the use of geodesic domes or self-supporting roofs as BACT to control these and tank emissions.

2. *Vapor Pressure Errors*

The Neg.Dec. calculated emissions from the new and modified tanks using the U.S. EPA TANKS 4.0.9d model. One of the key inputs into this model is the vapor pressure of the material contained in the tank. The TANKS model inputs and outputs are included in Neg.Dec. Appendix A. My review of this information indicates that the vapor pressures used in the TANKS calculations for three of the tanks are less than the permit limits proposed in the Neg.Dec, Table 1-1. As VOC (and TAC) emissions from tanks are directly proportional to vapor pressure, the VOC (and TAC) emissions and thus health risks were thus underestimated by a factor of 1.43 as summarized in Table 5 and further explained below.

**Table 5.**  
**Revised VOC Emissions**  
**(lb/day)**

Source	Baseline ND Table 2-5	Project ND Table 2-5	Project Net Increase	Revised Project Emissions	Revised Net Increase
Tank 300035		29.7	29.7	33.9	33.9
Tank 300036		29.7	29.7	33.9	33.9
Tank 80038	24.3	44.4	20.1	73.3	49.0
Tank 80079	7.2 <sup>125</sup>	8.9	1.7	-	1.7
Fugitives		2.9	2.9	-	2.0
<b>TOTAL</b>	<b>31.5</b>	<b>115.6</b>	<b>84.1</b>	<b>-</b>	<b>120.5</b>

<sup>122</sup> See, e.g., Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, September 6, 2013, Table 1-1, Draft Negative Declaration, Available at: [https://www.aqmd.gov/CEQA/documents/2013/nonaqmd/Draft\\_ND\\_Phillips\\_66\\_Crude\\_Storage.pdf](https://www.aqmd.gov/CEQA/documents/2013/nonaqmd/Draft_ND_Phillips_66_Crude_Storage.pdf)

<sup>123</sup> City of Richmond, Chevron Refinery Modernization Project, Environmental Impact Report, Volume 1: Draft EIR, March 2014 (Chevron DEIR), Available at: <http://chevronmodernization.com/project-documents/>.

<sup>124</sup> Chevron DEIR, Chapter 4.3.

<sup>125</sup> The net increase in emissions from this tank were based on the permitted throughput in the baseline as tank operation in the baseline years were not representative of routine operation. However, Application 556835 for Tank 80079 at pdf 36 indicates that this tank operated in violation of its throughput limit of 350,000 lb/mo in 2012 (2,067,903 bbl/mo).

3. *VOC Emissions from Tanks 300035/300036 are Underestimated*

The proposed permit conditions in the Neg.Dec. include a true vapor pressure limit of <11.0 psi for the two new 300,000 bbl tanks.<sup>126</sup> This corresponds to a Reid Vapor Pressure (RVP) of about 12 psi at the liquid bulk temperature of 66.5 F analyzed in the Tank model.<sup>127</sup> However, the tank analysis in Appendix A analyzed a crude with a RVP of 10.5 psi. The higher the RVP, the higher the VOC emissions. Thus, the tank analyses underestimated VOC and TAC emissions from these tanks by roughly a factor of  $12/10.5 = 1.14$  by underestimating vapor pressure.

4. *VOC Emissions from Tank 80038 are Underestimated*

Tank 80038 is a 80,000 bbl fixed roof tank currently permitted to store petroleum distillate products with true vapor pressure less than 0.5 psi. The Project proposes to modify permit conditions for this tank to allow it to store petroleum distillate products at a temperature of up to 190 F with a true vapor pressure of  $\leq 5.0$  psi and to impose a throughput limit of 600,000 bbl/mo.<sup>128</sup> The tank would be connected to the existing vapor recovery system, replacing capacity formerly used by Tanks 80035 and 80036, which will be removed from vapor recovery and retired.<sup>129</sup> The baseline (2010-2011) throughput of existing Tank 80038 was 61,076 bbl/mo.<sup>130</sup>

The Applicant's permit application submitted to the SCAQMD for this tank and the Neg.Dec., Table 1-1, indicate that Tank 80038 would be permitted with a true vapor pressure of  $\leq 5$  psi at 190 F as gas oil and distillate products stored in this tank may come directly from a process unit at temperatures of about 190 F. Application 554668, pdf 63, 87. The higher the temperature of the stored material, the higher the VOC emissions. This permit application estimated VOC emissions of 73.3 lb/day (at pdf p. 118), assuming the proposed permit limit true vapor pressure of  $\leq 5$  psia at 190 F and a vapor recovery control efficiency of 99%.<sup>131</sup>

However, the TANKS analysis in Appendix A of the Neg.Dec. calculated VOC emissions of 44.4 lb/day, assuming a true vapor pressure of 3 psi at 150 F and a vapor recovery control efficiency of 99%.<sup>132</sup> Thus, the VOC emissions were underestimated.

<sup>126</sup> ND, Table 1-1.

<sup>127</sup> ND, Appx. A.

<sup>128</sup> July 16, 2013 Application #554668 for Alteration/Modification – Storage Tank 80038 (D587; Process 15, System 1) and Vapor Recovery System (Process 21, System 3), (7/16/13 Application 554668), pdf 82-129.

<sup>129</sup> ND, p. 1-4.

<sup>130</sup> Application 554668, pdf 43-44.

<sup>131</sup> The July 16, 2013 Application assumed a control efficiency of 99.9%, but the SCAQMD, in email correspondence date November 1, 2013 (Sawsan Andrawis to Royann Winchester), required the use of a 99% control efficiency, pdf 32.

<sup>132</sup> ND, p. A-42.



The Neg.Dec. underestimated VOC and TAC emissions by assuming a vapor pressure 3 psi at 150 F when the permitted value would be 5 psi at 160 F, or by a factor of 1.67 ( $5/3=1.67$ ).

5. *Pipeline Throughput Emission Increases*

As discussed elsewhere in these Comments, the Project includes replacing all 12-inch diameter tank interconnecting pipeline with 42-inch diameter pipeline, which would allow an increase in throughput, both imports to and exports from the Tank Farm by a factor of 12.25. The Neg.Dec. does not contain any of the information required to estimate the resulting increase in VOC and TAP emissions, including a list of the tanks that would be connected to the new pipeline, their permit IDs, contents, any throughput limits, whether they are connected to vapor recovery, and their baseline VOC emissions. It only states that the new pipeline will "reconnect other tanks throughout the tank farm", without even clarifying the boundaries of the "tank farm". The Title V permit identifies many more than 20 tanks.

The only thing the Neg.Dec. discloses about other tanks at the Tank Farm is that "[t]he Wilmington Operations currently utilize 20 storage tanks (see Figure 1-2) to store crude oil and other heavy petroleum liquids (18 have a capacity of 80,000 barrel (bbl) and two have a capacity of 125,000 bbl.)"<sup>133</sup> The Project would eliminate two of the 80,000 bb fixed roof tanks and change the service of two others, leaving 14 additional unidentified 80,000-bbl fixed roof tanks and two 125,000-bbl floating roof tanks whose emissions could increase in proportion to the increase in the diameter of the pipeline if they are not restricted by throughput limits. Assuming that each of these 16 tanks emitted the same amount of VOCs as Tank 80038 in the baseline (Table 2-5: 24.3 lb/day), the increase in VOC emissions from these 16 unidentified tanks would be 4,373 lb/day.<sup>134</sup> This is a conservative, lower-bound estimate of the potential increase as Tank 80038 stored low volatility petroleum distillates (TVP<0.5 psi) in the baseline (ND, Table 1-1) and thus would have lower emissions than tanks that stored more volatile material, which is most everything else. Even if one assumed that each of the 16 unidentified tanks emitted only 1 lb/day in the baseline, the increase in VOC emissions from debottlenecking Tank Farm throughput would be 180 lb/day, which is still highly significant compared to the significance threshold of 55 lb/day.

The HRA is based on the net increase in VOC emissions from the Project of 84.1 lb/day from only the modified tanks in Table 1-1. Assuming the other 16 tanks increased their emissions to 4,373 lb/day, as estimated above, this amounts to an increase in VOC emissions from the Tank Farm of a factor of 52 ( $4,373/84.1 = 52$ ). Thus, increasing the cancer and other health risks estimated by the Neg.Dec. by a factor of 52 would be justified. I, however, conservatively assumed only an increase of 12.25, the same as the increase in throughput, which is based on 5 lb/day for each of the 16 unidentified tanks.

<sup>133</sup> ND, p. 1-1.

<sup>134</sup> Increase in VOC emissions:  $(24.3 \text{ lb/day})(12.25)(16) - (24.3 \text{ lb/day})(16) = 4374 \text{ lb/day}$ .

#### 6. *Tank Flashing Emissions Omitted*

Most Bakken crudes are transported raw, without stabilization, due to the lack of facilities in the oil fields, as discussed elsewhere these Comments. Unstabilized or “live” crude oils have high concentrations of volatile materials entrained in the bulk crude oil. Tank flashing emissions occur when these crude oils, such as Bakken, are exposed to temperature increases or pressure drops. When this occurs, some of the compounds that are liquids at the initial pressure/temperature transform into gases and are released or “flashed” from the liquid. These emissions are in addition to working and breathing emissions from tanks and are not estimated by the EPA TANKS 4.0.9d model. These emissions can be calculated using standard procedures.<sup>135</sup> The Neg.Dec. did not mention or calculate these emissions, nor does it include permit conditions that would allow only stabilized crude oils to be received.

#### 7. *Water Draw Tank Emissions Omitted*

Crude oil typically contains small amounts of water, which is separated from the crude oil and accumulates in the bottom of storage tanks. This accumulated water, referred to as water draw, is typically transferred from the crude oil storage tanks into a smaller water draw surge tank for processing prior to disposal. Over time, a thick layer of crude oil forms in the water draw surge tank. The water draw surge tank and processing of wastewaters from it emit VOC and TACs. The Neg.Dec. does not mention water draw, or include emissions from storing or processing it, which would increase as the throughput of crude oil through the Tank Farm would increase.

### C. **Vapor Recovery System Emissions Omitted**

The Neg.Dec. asserts the purpose of the Project is to relax a capacity constraint in the vapor recovery system. The vapor recovery system collects organic vapors from throughout the Refinery, compresses them, routes them through an amine absorber where H<sub>2</sub>S is removed, and routes them to the Refinery fuel gas system, where they are blended with natural gas and combusted in heaters and boilers throughout the Refinery.

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<sup>135</sup> See, e.g., calculation methods at: Paul Peacock, Marathon, Bakken Oil Storage Tank Emission Models, March 23, 2010, Available at <file:///C:/Users/Phyllis/Downloads/Peacock - March 23 2010. ppt.pdf>; TCEQ, Air Permit Reference Guide APDG 5941, Available at: [http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/guidance\\_flas\\_hemission.pdf](http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/guidance_flas_hemission.pdf); Kansas Dept. of Health & Environment, Available at: [http://www.kdheks.gov/bar/download/Calculation\\_Flashing\\_Losses\\_Handout.pdf](http://www.kdheks.gov/bar/download/Calculation_Flashing_Losses_Handout.pdf); B. Gidney and S. Pena, Upstream Oil and Gas Storage Tank Project Flash Emissions Models Evaluation, July 16, 2009, Available at: <http://www.bdlaw.com/assets/htmldocuments/TCEQ%20Final%20Report%20Oil%20Gas%20Storage%20Tank%20Project.pdf>.

Natural gas is a clean burning fuel and emits less greenhouse gases and other combustion emissions than refinery fuel gas when burned in heaters and boilers throughout the refinery. The more refinery fuel gas in the blend, the higher these emissions. The increase in throughput of the vapor recovery system increases the amount of refinery fuel gas burned in heaters and boilers throughout the refinery. The Project would increase throughput of the vapor recovery system, as explained below.

The total capacity of the vapor recovery system is 800,000 standard cubic feet per hour (scfh). The average load on this system prior to the Project was 353,322 scfh and the maximum daily average load was 539,002 scfh.<sup>136</sup> Thus, the baseline system had substantial unused capacity. As explained below, the Project will use up this excess capacity and thus increase emissions.

The two existing 80,000 bbl fixed roof tanks that were routed to the system in the baseline (2010-2011) processed 32,276 bbl/mo (80035) and 45,063 bbl/mo (80036), or an average of 45,063 bbl/mo.<sup>137</sup> These tanks will be removed from the vapor recovery system and the freed-up capacity shifted to tank 80038.<sup>138</sup> However, the throughput that tank 80038 would be permitted to handle is 600,000 bbl/mo, or 13 times more than displaced from the shutdown of tanks 80035/36. Thus, the full capacity of the vapor recovery system would be utilized by the Project. Further, it is reasonably foreseeable that if the proposed throughput of tank 80038 (600,000 bbl/mo) is realized, an increase in vapor recovery capacity would be required. The resulting increase in emissions from these changes must be included in the HRA and air quality analysis.

#### **IV. THE PROJECT WILL RESULT IN SIGNIFICANT EMISSIONS OF CRITERIA AIR POLLUTANTS FROM THE UNLOADING OF CRUDES AT THE MARTINE TERMINAL**

The Neg.Dec. assumes that the Project would reduce emissions from marine vessels at the Marine Terminal. The assumption is unsupported and is incorrect. Tesoro currently unloads crude oil for the Wilmington Operations at the Port of Long Beach Berths 84-87.<sup>139</sup> The Neg.Dec. asserts that ship emissions will decline as the higher unloading rate facilitated by the Project, from 5,000 bbl/hr to 15,000 bbl/hr, would allow ships to unload more quickly and thus remain at berth for less time, assuming no increase in throughput. The Neg.Dec. asserts this would reduce emissions

<sup>136</sup> Application 554668, pdf 40-41.

<sup>137</sup> Letter from Daniel L. Carlson, Tesoro, to Sawsan Andrawis, SCAQMD, Re: Revisions for Application for Permit to Construct AQMD Application Nos. 545646 & 545745 for Tank No. 300035 and Tank No. 300036, March 7, 2013, SCAQMD File 545646 (3/7/13 Revised Application). Tank 80035 2010-2011 baseline throughput reported as 32,276 bbl/mo at pdf 52 and Tank 80036 2010-2011 baseline throughput reported at 45,063 bbl/mo at pdf 74.

<sup>138</sup> ND, pp. 1-1, 1-8 & Table 1-1.

from auxiliary engines and boilers used while hoteling.<sup>140</sup> However, the Neg.Dec. does not propose any limitations on Marine Terminal nor Tank Farm throughput to assure there would be no increase in ship calls. Further, the Title V permit for the Marine Terminal does not contain any throughput limits. Finally, Tesoro Logistics has announced it plans to increase the throughput of this Terminal.

As discussed elsewhere in these Comments, the Project debottlenecks both the Tank Farm and Marine Terminal. Further, Tesoro and Tesoro LP have proposed to increase the throughput of the Marine Terminal, which currently has excess unused capacity. Thus, emissions from loading and unloading more crude oil and petroleum distillate would increase. There would be two sources of increased emissions: (1) auxiliary engines and boilers while ships hotels and (2) emissions from the vapor recovery system and tanks at the Marine Terminal.

#### A. Ship Emissions Would Increase

The Neg.Dec. estimated a decrease in ship emissions, based on faster unloading.<sup>141</sup> Faster ship unloading would allow more ship calls and more big ships, which would increase ship emissions from auxiliary engines and boilers while hotelling, absent a condition restricting it.

The Marine Terminal is currently limited to a discharge capacity of 5,000 bbl/hr by a vapor recovery system constraint, but has a design capacity of 32,000 bbl/hr.<sup>142</sup> The design capacity could be completely utilized after the Project is operational as the pipeline connecting the Tank Farm with the Marine Terminal will be increased to 42 inches. This is greater than the Marine Terminal pipeline at 24 inches, which removes the pipeline bottleneck from the Tank Farm to the Terminal. The Neg.Dec. estimated existing emissions for Panamax (320,000 bbl capacity) and Aframax (720,000 bbl capacity) ships in pounds per 1000 barrels of crude unloaded.<sup>143</sup>

I revised the Neg.Dec.'s emission factors in lb/1000 bbl to assume an unloading rate of 32,000 lb/hr, but otherwise using all of the Neg.Dec.'s assumptions. The resulting emission factors and increase in ship emissions are summarized in Table 6 for a Panamax ship and in Table 7 for an Aframax ship. Using these emission factors, the increase in criteria pollutant emissions allowed by the Project would result in significant

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<sup>139</sup> ND, p. 1-1.

<sup>140</sup> ND, p. 2-20 & Table 2-6.

<sup>141</sup> The ship emission summary in the Neg.Dec., Table 2-6, is incorrect. It reports alleged emissions reductions in lb/100,000 bbl delivered. However, the emission calculations in Appendix A indicate that the values in this table are actually lb/1000 bbl delivered.

<sup>142</sup> Port of Long Beach, Tesoro Refining & Marketing - Pier B, Available at: <http://www.polb.com/economics/cargotenant/liquid/tesoro.asp>.

<sup>143</sup> ND, pp. A-55 & A-56.

emissions of all criteria pollutants from the Marine Terminal for Panamax ships and for all criteria pollutant except PM10 for Aframax ships. The CO<sub>2</sub>e emissions are not significant for either type of ship. These are significant impacts that were not disclosed in the Neg.Dec.

**Table 6.  
Increase in Emissions from Unloading Panamax Ships**

Pollutant	Revised Emission Factor <sup>144</sup> (lb/1000 bbl)	Emission Increase <sup>145</sup> (lb/day)	Significance Threshold ND, Table 2-5 (lb/day)	Significant?
VOC	1.0	648	55	Yes
CO	2.4	1,555	550	Yes
NO <sub>x</sub>	28	18,144	55	Yes
Sox	0.8	518	150	Yes
PM10	0.5	454	150	
PM2.5	0.4	324	55	
CO <sub>2e</sub>	0.6	713	10,000 MT/yr	No

The emission calculations for Aframax ships in Appendix A contain an error that overestimates emissions from these ships. The calculations divided the total emissions by the size of a Panamax ship (320,000 bbl) to calculate emission factors in lb/1000 bbl, rather than the size of a Aframax ship (720,000 bbl) in the last step of the calculations.<sup>146</sup> I corrected this error in my revised calculations.

<sup>144</sup> Emission factors per 1000 barrels delivered reported in the Neg.Dec. for Panamax ships (p. A-55) revised to reduce hoteling emissions, based on an increase in unloading rate from 15,000 bbl/hr to 32,000 bbl/hr: as follows: = [[total Project emissions - hoteling emissions + (15/32)x(hotelling emissions)]/320 bbl]. Example for VOCs: [338.91 - 27.0 + (15/32)(27.0)]/320 = 1.014 lb/1000 bbl.

<sup>145</sup> Emission increase: (lb/1000 bbl)(32,000-5,000 bbl/hr)(24 hr/day). For VOCs: (1.0 lb/1000 bbl)(32,000-5,000 bbl/hr)(24 hr/day) = 648 lbs.

<sup>146</sup> ND, p. A-56.

Table 7.  
Increase in Emissions from Unloading Aframax Ships

Pollutant	Revised Emission Factor <sup>147</sup> (lb/1000 bbl)	Emission Increase <sup>148</sup> (lb/day)	Significance Threshold ND, Table 2-5 (lb/day)	Significant?
VOC	0.6	389	55	Yes
CO	1.4	907	550	Yes
NOx	16	10,368	55	Yes
SOx	0.7	454	150	Yes
PM10	0.2	130	150	No
PM2.5	0.2	130	55	Yes
CO <sub>2e</sub>	0.4	259	10,000 MT/yr	No

#### B. Marine Vessel Unloading Emissions Were Omitted

In addition to an increase in ship hoteling emissions, unloading increased amounts of crude oil and loading increased amounts of refined products at the Marine Terminal would increase VOC and combustion emissions from the unloading operation. These were not disclosed in the Neg.Dec.

The Marine Terminal contains a number of emission sources, including five fixed roof tanks, loading/unloading arms, pumps, and a vapor recovery system. The Marine Terminal Title V Permit limits emissions from all equipment subject to Rule 1142 to 2 lb/1000 bbl organic liquid loaded. Assuming an increase in loading rate from 5,000 bbl/hr to 32,000 bbl/hr, the VOC emissions would increase by 1,296 lb/day<sup>149</sup>, which exceeds the VOC significance threshold of 55 lb/day by a significant amount and is a significant undisclosed air quality impact.

#### V. RISK OF UPSET IMPACTS ARE SIGNIFICANT

The Neg. Dec. conducted a fire hazard analysis to determine if accidents involving the modified tanks would result in significant impacts. Fires generate thermal radiation or "heat flux" (i.e., the amount of heat per unit area of exposed surface). Heat flux is potentially injurious (i.e., burns the skin), depending on its level.

<sup>147</sup> Emission factors per 1000 barrels delivered reported in the Neg.Dec. for Aframax ships (p. A-56) revised to correct ship size error (use of 320,000 bbl rather than 720,000 bbl) and to reduce hoteling emissions, based on an increase in unloading rate from 15,000 bbl/hr to 32,000 bbl/hr: as follows: = [[total Project emissions - hoteling emissions + (15/32)x(hotelling emissions)]]/720 bbl]]. Example for VOCs: [446.39 - 58.5 + (15/32)(58.5)]/720 = 0.58 lb/1000 bbl.

<sup>148</sup> Emission increase: (lb/1000 bbl)(32,000-5,000 bbl/hr)(24 hr/day). For VOCs: (0.6 lb/1000 bbl)(32,000-5,000 bbl/hr)(24 hr/day) = 230.4 lb/day.

<sup>149</sup> Increase in VOC emissions from increased marine vessel unloading: 24x (32,000 - 5,000) x 2 lb/1000 bbl = 1,296 lb/day.

The Neg.Dec. selected a heat flux significance threshold 5 kilowatts per square meter ( $\text{kW}/\text{m}^2$ ). ND, Table 2-10. Serious injuries would start to be experienced at and above  $5 \text{ kW}/\text{m}^2$ . The Neg.Dec. analyzed only the heat flux impacts, but omitted other impacts of a fire, including explosions (e.g., BLEVES) and inhalation of smoke and toxics.

The CANARY model was used to predict the maximum downwind distance that would experience a heat flux of  $5 \text{ kW}/\text{m}^2$ . If the downwind distance fell within the boundary of the Wilmington Operations, the Neg.Dec. concluded impacts would not be significant as there were no off-site receptors.<sup>150</sup> Although not explicitly stated, if the downwind distance fell outside of the facility boundary, off-site receptors could be exposed and the impact would be significant. Using this methodology, the Neg.Dec. concluded that all proposed tank modifications would not result in a significant impact.<sup>151</sup> However, the fire hazard analysis failed to analyze all plausible accident scenarios. As discussed below, the Project would result in significant fire hazards.

**A. Fire Hazards to Workers Are Significant**

The Neg.Dec. only evaluated the fire hazards to off-site receptors. However, on-site workers would be the most exposed parties and should be considered. Any person, including workers, located between the accident site up to the reported impact distance would experience significant impacts. Between the tank and the maximum impact distance, where workers are likely to be present, 100% of the exposed population would be injured, including second-degree burns in 14 seconds, 10% fatality at 60 seconds, and significant fatalities near the tanks. At a heat flux of  $5 \text{ kW}/\text{m}^2$ , 10% injury would be experienced. These are significant impacts.

**B. Fire Hazards From New Crude Oil Tanks (300035/36) Are Significant**

The Project would replace two 80,000 bbl HCU feedstock storage tanks with two new 300,000 bbl crude oil storage tanks. Thus, the amount of crude oil involved in an accident will increase by a factor of 3.75 ( $300/80 = 3.75$ ). Further, the throughput of these tanks would increase even more, from an average of 45,063 bbl/mo to 1,500,000 bbl/mo. Thus, if an accident occurred while the tank(s) were being filled, far more than just the capacity of the tank could be spilled. In addition, as discussed elsewhere in these comments, the composition of the material stored in the tanks will change. All of these changes will increase the consequences of a fire involving the tanks.

The Neg.Dec. conducted a fire hazard analysis of the increase in storage capacity only and concluded that the impacts were not significant because the fire hazard zone (280 ft. from the tanks) was contained within the Tank Farm boundary (375 ft. from the

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<sup>150</sup> ND, p. 2-56.

<sup>151</sup> ND, Table 2-10 & p. 2-56.



tanks).<sup>152</sup> This conclusion is based on a pool fire involving any one of the subject tanks.<sup>153</sup> However, due to the proximity of the new storage tanks, as well as many other surrounding storage tanks (ND, Fig. 3, p. C-7), the possibility that multiple tanks could catch on fire should have been assessed. Multiple-tank fires at tank farms have occurred. For example, in 1990, a fire at the Stapleton IAP Denver, CO, tank farm burned multiple tanks for 56 hours.<sup>154</sup> At the Pennzoil Refinery in Pennsylvania in 1995, a fire in one tank ignited by an ignition source flashed back into the tank, causing the tank to fail along its bottom seam. The burning liquid released from the first tank caused ignition of flammable vapors in the adjacent tank.<sup>155</sup>

The impact of both new 300,000 bbl tanks catching fire can be extrapolated from the results presented in the Neg.Dec., Table 2-10. Assuming two 300,000 bbl tanks were involved in a pool fire, the maximum distance from the center of the fire to the thermal radiation significance criterion used in the Neg.Dec. ( $5 \text{ kW/m}^2$ ) would be 504 ft.,<sup>156</sup> based on the applicant's analysis. This extends 129 ft. outside of the Wilmington Operations boundary and encompasses portions of Alameda Street, a public highway. Thus, off-site receptors could be exposed. Therefore, this is a significant impact that was not disclosed in the Neg.Dec. Further, actual impacts are likely even greater than indicated by this analysis for several reasons.

First, as the tanks are close together, a pool fire that starts at either or both of the new 300,000 bbl tanks could spread to other nearby tanks.<sup>157</sup> Thus, more than two tanks could be involved in a pool fire.

Second, a pool fire is not the worst case accident that could occur at these tanks. If the crude oil stored in the new tanks spilled, flashed and ignited quickly, as is likely in an earthquake, or due to derailment of a nearby train, a fireball would be more likely than a pool fire due to the chemical composition of Bakken crude oil. Bakken crude oil has a very high vapor pressure ( $\text{RVP} > 9 \text{ psi}$ ) and a very low flash point ( $< -35 \text{ F}$ ), which is much lower than ambient temperatures in the area.<sup>158</sup> In fact, these new tanks are being permitted to store material with a true vapor pressure up to 11 psi, anticipating

<sup>152</sup> ND, p. 2-56.

<sup>153</sup> ND, pp. 2-56, C-1.

<sup>154</sup> For example: [https://www.youtube.com/watch?v=8moBLZA0\\_dw](https://www.youtube.com/watch?v=8moBLZA0_dw).

<sup>155</sup> U.S. EPA, EPA Chemical Accident Investigation Report. Pennzoil Product Company Refinery, Rouseville, Pennsylvania, Report EPA 550-R-98-001, March 1998, Available at: <http://www.epa.gov/oem/docs/chem/pennzoil.pdf>.

<sup>156</sup> The analysis in Neg.Dec., Table 2-10 indicates that increasing the volume of material involved in a fire from 80,000 bbl to 300,000 bbl ( $300/80 = 3.75$ ) increases the distance to the  $5 \text{ kW/m}^2$  criterion from 190 ft to 280 ft ( $280/190 = 1.5$ ). Thus, increasing the volume of material from 300,000 bbl to 600,000 bbl ( $600/300 = 2$ ) will increase the distance to the  $5 \text{ kW/m}^2$  criterion from 280 ft. by a factor 0.8 ( $2 \times 1.5/3.75 = 0.8$ ). Thus, the distance from the tanks to the maximum hazard distance is  $280 \text{ ft.} + 0.8 \times 280 = 504 \text{ ft.}$

<sup>157</sup> See, for example, Neg.Dec., Appx. C, Fig. 4, p. C-8.

<sup>158</sup> TSBC 2013.

highly volatile material such as Bakken crudes. Thus, vapors would flash when released and if they encountered an ignition source, would immediately ignite. In these situations, the result is usually a fireball, not a pool fire.

Spilled material that does not ignite immediately, on the other hand, spreads out and accumulates in a pool.<sup>159</sup> This latter scenario was assumed in the Neg.Dec. and is not the worst case. Immediate ignition cannot be eliminated in an accident that would release all of the tank contents as sparks from tank collapse would be present. A fireball would result in much more significant impacts than those discussed above.

Third, the fire hazard analysis appears to be based on the capacity of the tanks, rather than the maximum amount of material that could be released. This is evident as the fire hazard zone for all of the 80,000 bbl tanks (80035/36, 80038, 80079) is 190 ft. even though the throughput of one of them was increased. This could only occur if the analyses were based on both the same amount of material released (and the same material composition.) Both of these assumptions are wrong. If material were moving through the tank(s) at the time of an accident, more could be released than the capacity of the tank. As the Project would increase the throughput of Tanks 80035/36 from 45,063 bbl/mo to 1,500,000 bbl/mo, this increased throughput must be evaluated.

Fourth, the fire hazard analysis in the Neg.Dec. is not supported and appears to have been based on the same baseline petroleum product (which is not Bakken crude oil) in all tanks. The distance to the chosen fire thermal radiation significance threshold of 5 kW/m<sup>2</sup> depends on several factors, including wind speed, relative humidity, ambient temperature, volume of crude spilled, the discharge temperature of the crude oil, the assumed average flame temperature, average emissive power, the burning rate of the crude oil, the release duration, and the release rate, among others.

The supporting analysis in Appendix C reports the assumed ambient conditions, but fails to disclose the identity of or any of the characteristics of the material involved in the pool fire, including the assumed discharge temperature of the crude oil and its burning rate, which are the key factors that determine the propagation of flames. Rather, it appears to assume the same baseline hydrocarbon material in each analysis. As Bakken crude oil is a likely material for Project implementation, the Neg.Dec. should have considered Bakken for the purpose of a hazards impacts analysis. Bakken crudes are highly flammable and thus would have a much higher burning rate than other crudes that have been historically handled at the Tank Farm. Based on my experience, I would expect a pool fire at a 300,000 bbl tank of Bakken crude to have a much greater radius of impact than suggested in the Neg.Dec.'s analysis.

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<sup>159</sup> TSBC 2013, Sec. 3.5.6 & Fig. 5.

Finally, the fire hazard analysis in the Neg.Dec. is based on a wind speed of only 20 mi/hr, as this is the "worst case for fires as flame is bent downward."<sup>160</sup> However, wind speeds in Long Beach can be much higher.<sup>161</sup> Higher speeds spread the fire hazard zone over a larger area than disclosed in the Neg.Dec. Further, higher wind speeds can carry a vapor cloud long distances, into residential areas, before it ignites. Thus, the Neg.Dec. underestimates impacts by selecting an unreasonably low wind speed for its worst case analysis.

### C. Fire Hazards of Other Storage Tanks Underestimated

The Project involves modifications to four 80,000 bbl tanks. The Neg.Dec. reports the same fire hazard zone for all of these tanks, 190 ft., suggesting the Neg.Dec. assumed the same material composition and tank capacity in its analyses.<sup>162</sup> However, this is not plausible as the Project would change the service and/or throughput of these tanks, which would change the fire hazard zone. The failure to consider actual Project changes underestimates impacts.

First, Tank 80038 is currently permitted to store petroleum distillate with a true vapor pressure less than 0.5 psi. This material is not highly flammable. The Project will change the service to light hot gas oil (RVP likely much greater than 0.5 psi) and connect it to the vapor recovery system. Thus, the new material stored in Tank 80038 will be more flammable and more likely to result in a greater fire hazard than the original tank. The fire hazard analysis shows no change in the distance to the 5 kW/m<sup>2</sup> boundary in the before and after cases. Both are reported as 190 ft. ND, Table 2-10. Thus, it is evident that the Neg.Dec.'s fire analysis did not consider the chemical and physical properties of the stored materials and thus is fundamentally flawed.

The much more volatile material in the modified tank would have a higher burning rate and be much more likely to result in a fire ball, rather than a pool fire. The distance to the 5 kW/m<sup>2</sup> flux boundary for the modified tank would thus be greater than 190 ft. Because 190+ ft. falls outside of the 117 ft. distance to the facility boundary, the impact is per se significant under the Neg.Dec.'s analysis scheme.

Second, the permitted throughput of Tank 80079 is proposed to increase from 80,000 bbl/mo to 500,000 bbl/mo. This means that in an accident, more material could be released after the Project than before. In spite of this obvious fact, the Neg.Dec. reports the same hazard zone for the existing and modified tank. ND, Table 2-10.

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<sup>160</sup> ND, p. C-3

<sup>161</sup> Long Beach Weather Data, Available at: <http://www.642weather.com/weather/stats.php> and <http://www.wunderground.com/personal-weather-station/dashboard?ID=KWALONGB2>

<sup>162</sup> ND, Table 2-10, p. 2-56.

#### D. Fire Hazards from Pipeline Accident Are Significant

The stated purpose of the Project is to increase the rate of unloading of ships from the current restrained rate of 5,000 bbl/hr to 15,000 bbl/hr.<sup>163</sup> To accommodate this increase, the Project also includes replacing the existing 12-inch diameter pipeline connecting all of the tanks with the pipeline from the Marine Terminal with a 42-inch diameter pipeline.<sup>164</sup>

The flow rate through a pipeline is directly proportional to the diameter of the pipeline, squared. Thus, increasing the diameter of the pipelines connecting the tanks would allow an increase in throughput of a factor of 12.25.<sup>165</sup> This would allow an increase in flow through the new pipeline from 5,000 bbl/hr to 61,250 bbl/hr ( $5,000 \times 12.25 = 61,250$ ). The consequences of accidents involving the release of crude from this new bigger pipeline that would contain more crude oil were not evaluated. A factor of 12.25 increase in the flow rate, and thus, the amount of crude oil and other petroleum products that could spill, would be significant. The new pipeline will be located above ground.<sup>166</sup> Thus, accidents involving this pipeline could result in the release of significant amounts of crude. Vapor clouds formed by such a spill could travel long distances before finding an ignition source and involve more than the spilled crude in an accident.

A pipeline accident was recently analyzed for another similar project, the Phillips 66 Rail Spur Extension Project in a Draft Environmental Impact Report (Phillips 66 DEIR).<sup>167</sup> This DEIR includes a crude pipeline accident analysis for a pool fire, assuming a spill of 692,000 barrels of crude for wind speeds of 2 mi/hr and 45 mi/hr, a reasonable range for a coastal location.<sup>168</sup> This magnitude accident is possible at the Wilmington Operations Tank Farm if the 42-inch diameter pipeline were running at maximum capacity during ship unloading and burst during an earthquake. The Marine Terminal, for example, currently can unload two ships that contain from 400,000 bbl to 720,000 bbls.<sup>169</sup> Thus, the Phillips 66 accident is comparable to a worst-case pipeline accident at the Tesoro Tank Farm. The results of the pool fire hazard analysis for this accident are summarized in Table 7.

<sup>163</sup> ND, pp. 1-1, 1-12.

<sup>164</sup> ND, p. 1-4.

<sup>165</sup> The increase in flow rate in the new pipeline:  $Q=(\pi/4)D^2V$ . Thus, the increase in Q, all else held constant, would be  $42^2/12^2 = 12.25$ .

<sup>166</sup> ND, Fig. 1-5.

<sup>167</sup> Marine Research Specialists (MRS), Phillips 66 Company Rail Spur Extension Project Public Draft Environmental Impact Report and Vertical Coastal Access Assessment, November 2013.

<sup>168</sup> Phillips 66 DEIR, Appx. H, pp. H-14 to H-17.

<sup>169</sup> ND, p. 1-1.

Table 7.  
Crude Pipeline Accident Pool Fire  
(Phillips 66 DEIR, Appx. H)

Heat Flux (kW/m <sup>2</sup> ) =	5	10	12.5
Wind Speed (ft/sec)	Impact Distance (ft)		
2	1647	889	764
45	2641	1555	1273

This analysis calculated impact distances for three heat fluxes. Serious injuries would start to be realized at and above 5 kW/m<sup>2</sup>, the significance threshold used in the Neg.Dec. All persons exposed to 10 kW/m<sup>2</sup> would suffer serious injuries. Exposure to thermal radiation levels in excess of 10 kW/m<sup>2</sup> would likely begin to generate fatalities in less than 1 minute. Thus, workers in the tank farm would suffer serious injuries.

Any population located between the accident site up to the reported impact distance, e.g., as far away as 2,641 feet in Table 7, would experience significant impacts. At a heat flux of 5 kW/m<sup>2</sup>, 10% injury would be experienced in the exposed population up to 2,641 feet from the accident if the wind were blowing at 45 mi/hr during the accident. Up to 1,555 feet from the accident, 100% of the exposed population would be injured, including second-degree burns in 14 seconds and 10% fatality at 60 seconds. And up to 1,273 feet from the accident, significant fatalities would occur.

A pipeline accident could occur anywhere along the pipeline route, shown in Fig. 1-3, but would most likely occur within the Tank Farm, where the crude oil is transferred into tankage. Assuming a pipeline accident at the Tank Farm under calm wind conditions (2 mi/hr), significant impacts would occur up to 1,647 feet from the accident site. At a wind speed of 45 mi/hr, all persons up to 2,641 feet away would be seriously impacted and within a radius of 1,273 feet from the accident site, they would all be killed.

Off-site receptors fall within these distances. In fact, the closest resident is located about 2,000 feet southwest of the Wilmington operations.<sup>170</sup> Thus, the impacts are per se significant. Further, sensitive receptors based on the Health Risk Assessment also fall within these distances. The Maximum Impact Location Map in the Neg.Dec. (Appx. B, p. B-12) indicates that both the maximum exposed individual resident (MEIR) and maximum exposed individual worker (MEIW) are within 2600 feet of locations within the Tank Farm where the pipeline may plausibly rupture.<sup>171</sup> The MEIW is only about 400 feet from one of the plausible locations of the release and the MEIR only about 1800 feet away.

<sup>170</sup> ND, p. 1-7 & Fig. 1-2.

<sup>171</sup> ND, Fig. 1-3.

Thus, clearly, a pipeline accident has the potential to result in significant off-site (as well as even more significant on-site worker) impacts that were not evaluated in the Neg.Dec.

**E. Fire and Other Hazards From Ship Accidents Are Significant**

The Neg.Dec. asserts that the throughput of the Marine Terminal would not increase. Thus, it did not evaluate the consequences of an accident involving ships importing larger quantities of crude. However, my analysis elsewhere in these Comments indicates that the Project will increase the throughput of the Marine Terminal from 5,000 bbl/hr to the current Terminal capacity of 32,000 bbl/hr and allow a potential further doubling of Terminal capacity in the future. Thus, ship accidents should have been evaluated.

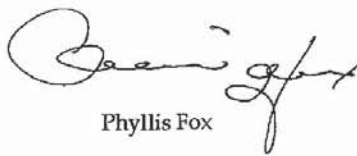
**F. Smoke And Inhalation Hazards Were Not Assessed**

A fire results in other environmental damages, besides heat injury. A fire releases TACs and smoke, which cause significant health impacts. A recent fire at the Chevron Richmond Refinery, which was contained on site, sent 15,000 people from the surrounding area for medical treatment due to the release and created huge black clouds of pollution billowing across the San Francisco Bay.<sup>172</sup> The fires evaluated in the Neg.Dec. involving similar materials would affect many far away offsite receptors. This is a significant impact that was not disclosed in the Neg.Dec.

**VI. CONCLUSION**

This concludes my analysis of the Neg.Dec. and the Project's environmental impacts. If you have any questions regarding these comments, please do not hesitate to contact me.

Sincerely,



Phyllis Fox

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<sup>172</sup> US Chemical Safety and Hazard Investigation Board, 2013, p.34 ("While Chevron stayed under its established crude unit design basis for total wt. % sulfur of the blended feed to the crude unit, the sulfur composition significantly increased over time. This increase in sulfur composition likely increased corrosion rates in the 4-sidecut line.").

## Index of Commonly Used Abbreviations and Terms

Marine Terminal Agreement	Long Beach Berth Access, Use and Throughput Agreement
Vancouver Application	Tesoro Savage, Application for Site Certification Agreement
Pacific L.A. Marine Terminal SEIR/DSEIR	Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft Supplemental Environmental Impact Statement/Draft Subsequent Environmental Impact Report
2/27/14 Tesoro Presentation	Tesoro, Transformation through Distinctive Performance, Simmons Energy Conference, February 27, 2014. Available at: <a href="http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-presentations">http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-presentations</a>
1/9/14 Tesoro Presentation	Tesoro, Deutsche Bank Energy Conference, January 9, 2014. Available at: <a href="http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-presentations">http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-presentations</a> .
3/7/13 Revised Application	Tesoro, Revisions for Application for Permit to Construct AQMD Application Nos. 545646 & 545745 Tank No. 300035 and Tank No. 300036, March 7, 2013
12/10/13 Tesoro Analyst & Investor Presentation	Thomas Reuters Streetevents Edit Transcript, 12/10/13 Tesoro Analyst and Investor Presentation
Q3 2013 Tesoro Earnings Call	November 7, 2013, Transcript available at: <a href="http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-transcriptsarchive">http://phx.corporate-ir.net/phoenix.zhtml?c=79122&amp;p=irol-transcriptsarchive</a>
VOCs	volatile organic compounds
TAN	total acid number
API gravity	The American Petroleum Institute gravity is a measure of how heavy or light a petroleum liquid is compared to water. If greater than 10, it is lighter and floats on water. If less than 10, it is heavier and sinks.
RVP	Reid vapor pressure in psi
TACs	toxic air contaminants
TVP	total vapor pressure in psi
ERC	Emission Reduction Credit
NSR	New Source Review
BACT	Best Available Control Technology
H <sub>2</sub> S	hydrogen sulfide
HCU	Hydrocracker Unit
bbl	Barrel
TSBC	Transportation Safety Board of Canada
Scfh	Standard cubic feet per hour
POLB	Port of Long Beach
Marine Terminal Title V Permit	Tesoro Logistics Operations LLC Long Beach, 820 Carrack Ave., Long Beach, Facility ID: 172878, September 27, 2013.
Bbl/mo	Barrel per month
ANS	Alaska North Slope
NGL	Natural gas liquids

Tesoro Los Angeles Refinery Crude Oil Imports 2015, downloaded by J.May, CBE 4/15/2016 from US EIA monthly petroleum imports by facility [www.eia.gov/petroleum/imports/companylevel/](http://www.eia.gov/petroleum/imports/companylevel/)

r\_PERIOD, CENTRY\_NAME, QUANTITY, SULFUR, APIGRAVITY, and PCOM\_NAME, and columns used for weighted average calculations were added by J.May

RPT_PER IOD	CENTRY_NAME	QUANTITY (Thousand barrels)	SULFUR	This column added by Jmay:		APIGRAVITY	This column added by Jmay:	
				For weighted av calc	For weighted av calc		For weighted av calc	PCOMP_SNAM
Dec-15	SAUDI ARABIA	626	1.94	1214.44	33.1	20,720.60	CARSON	
Dec-15	SAUDI ARABIA	680	1.94	1319.2	33.2	22,576.00	CARSON	
Dec-15	ANGOLA	222	0.64	142.08	29.1	6,460.20	CARSON	
Dec-15	ANGOLA	464	0.58	269.12	29.8	13,827.20	CARSON	
Dec-15	ANGOLA	695	0.65	451.75	29.3	20,363.50	CARSON	
Dec-15	IRAQ	517	2.51	1297.67	31.4	16,233.80	CARSON	
Dec-15	SAUDI ARABIA	41	1.97	80.77	32.1	1,316.10	CARSON	
Dec-15	SAUDI ARABIA	388	2.48	962.24	31.2	12,105.60	CARSON	
Nov-15	ANGOLA	320	0.43	137.6	31.2	9,984.00	CARSON	
Nov-15	ANGOLA	455	0.43	195.65	31.2	14,196.00	CARSON	
Nov-15	ANGOLA	779	0.3	233.7	33	25,707.00	CARSON	
Nov-15	AUSTRALIA	243	0.32	77.76	19.4	4,714.20	CARSON	
Nov-15	AUSTRALIA	284	0.32	90.88	19.4	5,509.60	CARSON	
Nov-15	IRAQ	347	2.55	884.85	31.5	10,930.50	CARSON	
Nov-15	IRAQ	354	2.54	899.16	31.4	11,115.60	CARSON	
Nov-15	IRAQ	844	2.51	2118.44	31.4	26,501.60	CARSON	
Nov-15	KUWAIT	198	2.62	518.76	30.2	5,979.60	CARSON	
Nov-15	SAUDI ARABIA	48	2.51	120.48	30.9	1,483.20	CARSON	
Nov-15	SAUDI ARABIA	342	2.06	704.52	32.7	11,183.40	CARSON	
Nov-15	SAUDI ARABIA	356	1.92	683.52	33.1	11,783.60	CARSON	
Nov-15	SAUDI ARABIA	391	2.61	1020.51	30.6	11,964.60	CARSON	
Nov-15	SAUDI ARABIA	655	2	1310	32.7	21,418.50	CARSON	



APPENDIX G1: RESPONSE TO COMMENTS

Oct-15	ANGOLA	757	0.29	219.53	32.7	24,753.90	CARSON
Oct-15	BRAZIL	462	0.27	124.74	32.1	14,830.20	CARSON
Oct-15	BRAZIL	522	0.27	140.94	32.1	16,756.20	CARSON
Oct-15	ECUADOR	275	1.74	478.5	21	5,775.00	CARSON
Oct-15	ECUADOR	17	0.29	4.93	32.7	555.90	CARSON
Oct-15	ECUADOR	768	0.38	291.84	32.1	24,652.80	CARSON
Oct-15	IRAQ	97	3.22	312.34	28.5	2,764.50	CARSON
Oct-15	IRAQ	870	3.18	2766.6	28.4	24,708.00	CARSON
Oct-15	SAUDI ARABIA	225	2.47	555.75	31.1	6,997.50	CARSON
Oct-15	SAUDI ARABIA	302	2.51	758.02	31.1	9,392.20	CARSON
Oct-15	SAUDI ARABIA	332	1.18	391.76	33.3	11,055.60	CARSON
Oct-15	SAUDI ARABIA	536	2.5	1340	31	16,616.00	CARSON
Sep-15	ANGOLA	613	0.29	177.77	32.7	20,045.10	CARSON
Sep-15	BRAZIL	354	0.37	130.98	30.1	10,655.40	CARSON
Sep-15	ECUADOR	100	1.74	174	20.8	2,080.00	CARSON
Sep-15	ECUADOR	341	1.34	456.94	24.9	8,490.90	CARSON
Sep-15	ECUADOR	378	1.75	661.5	20.7	7,824.60	CARSON
Sep-15	ECUADOR	87	0.29	25.23	32.7	2,844.90	CARSON
Sep-15	ECUADOR	157	0.4	62.8	32.2	5,055.40	CARSON
Sep-15	ECUADOR	318	0.41	130.38	32.3	10,271.40	CARSON
Sep-15	ECUADOR	535	0.4	214	32.8	17,548.00	CARSON
Sep-15	ECUADOR	440	1.92	844.8	33.8	14,872.00	CARSON
Sep-15	ECUADOR	119	0.41	48.79	32.3	3,843.70	CARSON
Sep-15	ECUADOR	344	0.4	137.6	32.2	11,076.80	CARSON
Sep-15	ECUADOR	413	0.37	152.81	32.6	13,463.80	CARSON
Sep-15	ECUADOR	467	0.37	172.79	30.6	14,290.20	CARSON
Aug-15	ANGOLA	235	0.44	103.4	32.8	7,708.00	CARSON
Aug-15	ANGOLA	549	0.44	241.56	32.8	18,007.20	CARSON
Aug-15	ANGOLA	699	0.35	244.65	30.8	21,529.20	CARSON
Aug-15	BRAZIL	199	0.35	69.65	30.3	6,029.70	CARSON
Aug-15	BRAZIL	224	0.29	64.96	31.4	7,033.60	CARSON
Aug-15	BRAZIL	421	0.36	151.56	30.5	12,840.50	CARSON

APPENDIX G1: RESPONSE TO COMMENTS

Aug-15	ECUADOR	360	1.81	651.6	20.4	7,344.00	CARSON
Aug-15	ECUADOR	394	1.92	756.48	20	7,880.00	CARSON
Aug-15	IRAQ	152	3.34	507.68	27.8	4,225.60	CARSON
Aug-15	IRAQ	377	3.34	1259.18	27.7	10,442.90	CARSON
Aug-15	IRAQ	390	3.34	1302.6	27.9	10,881.00	CARSON
Aug-15	SAUDI ARABIA	417	1.97	821.49	32.9	13,719.30	CARSON
Aug-15	RUSSIA	358	0.54	193.32	35	12,530.00	CARSON
Aug-15	RUSSIA	385	0.54	207.9	35.1	13,513.50	CARSON
Jul-15	ANGOLA	443	0.47	208.21	24.7	10,942.10	CARSON
Jul-15	ANGOLA	465	0.43	199.95	24.4	11,346.00	CARSON
Jul-15	BRAZIL	381	0.29	110.49	31.6	12,039.60	CARSON
Jul-15	BRAZIL	424	0.27	114.48	31.7	13,440.80	CARSON
Jul-15	ECUADOR	393	1.44	565.92	24.4	9,589.20	CARSON
Jul-15	IRAQ	394	3.1	1221.4	29.3	11,544.20	CARSON
Jul-15	IRAQ	561	3.1	1739.1	29.2	16,381.20	CARSON
Jul-15	SAUDI ARABIA	175	1.93	337.75	33	5,775.00	CARSON
Jul-15	SAUDI ARABIA	689	1.93	1329.77	33.1	22,805.90	CARSON
Jun-15	ANGOLA	187	0.45	84.15	28.5	5,329.50	CARSON
Jun-15	ANGOLA	401	0.45	180.45	28.6	11,468.60	CARSON
Jun-15	BRAZIL	181	0.38	68.78	31.8	5,755.80	CARSON
Jun-15	BRAZIL	236	0.38	89.68	30.7	7,245.20	CARSON
Jun-15	BRAZIL	346	0.38	131.48	30.9	10,691.40	CARSON
Jun-15	BRAZIL	412	0.38	156.56	31	12,772.00	CARSON
Jun-15	ECUADOR	395	1.35	533.25	25.1	9,914.50	CARSON
Jun-15	ECUADOR	574	1.36	780.64	25.1	14,407.40	CARSON
Jun-15	IRAQ	183	3	549	29.2	5,343.60	CARSON
Jun-15	IRAQ	224	3	672	29.3	6,563.20	CARSON
Jun-15	IRAQ	291	4	1164	27.5	8,002.50	CARSON
Jun-15	IRAQ	297	3.1	920.7	29.4	8,731.80	CARSON
Jun-15	IRAQ	315	4	1260	27.4	8,631.00	CARSON
Jun-15	IRAQ	683	4	2732	27.4	18,714.20	CARSON
Jun-15	SAUDI ARABIA	149	2	298	39.5	5,885.50	CARSON

APPENDIX G1: RESPONSE TO COMMENTS

Jun-15	SAUDI ARABIA	452	2	904	33.1	14,961.20	CARSON
Jun-15	SAUDI ARABIA	551	2	1102	33.2	18,293.20	CARSON
May-15	ANGOLA	155	0.45	69.75	33	5,115.00	CARSON
May-15	ANGOLA	418	0.45	188.1	32.6	13,626.80	CARSON
May-15	BRAZIL	264	0.38	100.32	30	7,920.00	CARSON
May-15	BRAZIL	433	0.38	164.54	29.8	12,903.40	CARSON
May-15	ECUADOR	215	1	215	25.1	5,396.50	CARSON
May-15	IRAQ	128	4	512	27	3,456.00	CARSON
May-15	IRAQ	269	3	807	27.3	7,343.70	CARSON
May-15	IRAQ	271	3.42	926.82	27.5	7,452.50	CARSON
May-15	IRAQ	398	3.42	1361.16	27.6	10,984.80	CARSON
May-15	PERU	60	1	60	18.3	1,098.00	CARSON
May-15	PERU	120	1	120	21.6	2,592.00	CARSON
May-15	SAUDI ARABIA	386	2.01	775.86	32.9	12,699.40	CARSON
May-15	SAUDI ARABIA	598	2	1196	33.1	19,793.80	CARSON
Apr-15	ANGOLA	368	0.45	165.6	33	12,144.00	CARSON
Apr-15	ANGOLA	476	0.5	238	28.4	13,518.40	CARSON
Apr-15	BRAZIL	278	0.38	105.64	29.9	8,312.20	CARSON
Apr-15	BRAZIL	345	0.38	131.1	29.9	10,315.50	CARSON
Apr-15	BRAZIL	370	0.38	140.6	29.9	11,063.00	CARSON
Apr-15	ECUADOR	325	1.42	461.5	24.4	7,930.00	CARSON
Apr-15	IRAQ	199	3.42	680.58	27.5	5,472.50	CARSON
Apr-15	IRAQ	354	3.42	1210.68	27.4	9,699.60	CARSON
Apr-15	IRAQ	365	3.42	1248.3	27.6	10,074.00	CARSON
Apr-15	IRAQ	391	3.42	1337.22	27.3	10,674.30	CARSON
Apr-15	SAUDI ARABIA	290	2.01	582.9	33.2	9,628.00	CARSON
Apr-15	SAUDI ARABIA	294	2.01	590.94	33	9,702.00	CARSON
Apr-15	SAUDI ARABIA	318	2.01	639.18	33	10,494.00	CARSON
Apr-15	SAUDI ARABIA	350	2	700	32.8	11,480.00	CARSON
Apr-15	SAUDI ARABIA	384	2.01	771.84	32.8	12,595.20	CARSON
Mar-15	SAUDI ARABIA	316	1.94	613.04	33.2	10,491.20	CARSON

APPENDIX G1: RESPONSE TO COMMENTS

Mar-15	ANGOLA	334	0.45	150.3	27.3	9,118.20	CARSON
Mar-15	ANGOLA	375	0.45	168.75	27.3	10,237.50	CARSON
Mar-15	BRAZIL	476	0.41	195.16	30	14,280.00	CARSON
Mar-15	BRAZIL	517	0.41	211.97	29.9	15,458.30	CARSON
Mar-15	COLOMBIA	308	0.55	169.4	31.5	9,702.00	CARSON
Mar-15	COLOMBIA	624	0.47	293.28	31.5	19,656.00	CARSON
Mar-15	ECUADOR	322	1.9	611.8	20.2	6,504.40	CARSON
Mar-15	ECUADOR	326	1.9	619.4	20	6,520.00	CARSON
Mar-15	ECUADOR	327	1.83	598.41	20.8	6,801.60	CARSON
Mar-15	IRAQ	163	3.52	573.76	26.6	4,335.80	CARSON
Mar-15	IRAQ	197	3.52	693.44	26.7	5,259.90	CARSON
Mar-15	IRAQ	683	3.52	2404.16	26.7	18,236.10	CARSON
Mar-15	SAUDI ARABIA	114	1.92	218.88	33.1	3,773.40	CARSON
Feb-15	ANGOLA	165	0.42	69.3	25.1	4,141.50	CARSON
Feb-15	ANGOLA	179	0.44	78.76	25.2	4,510.80	CARSON
Feb-15	ANGOLA	390	0.47	183.3	25.3	9,867.00	CARSON
Feb-15	ANGOLA	654	0.47	307.38	25	16,350.00	CARSON
Feb-15	ANGOLA	729	0.42	306.18	25	18,225.00	CARSON
Feb-15	COLOMBIA	380	0.67	254.6	28.1	10,678.00	CARSON
Feb-15	ECUADOR	392	1.37	537.04	24.5	9,604.00	CARSON
Feb-15	ECUADOR	450	1.37	616.5	24.3	10,935.00	CARSON
Feb-15	IRAQ	347	3.52	1221.44	27.2	9,438.40	CARSON
Feb-15	IRAQ	572	4	2288	27.2	15,558.40	CARSON
Feb-15	IRAQ	594	3.62	2150.28	26.6	15,800.40	CARSON
Feb-15	SAUDI ARABIA	309	1.04	321.36	40	12,360.00	CARSON
Jan-15	ANGOLA	383	0.43	164.69	25.3	9,689.90	CARSON
Jan-15	ANGOLA	399	0.43	171.57	24.6	9,815.40	CARSON
Jan-15	BRAZIL	499	0.39	194.61	30	14,970.00	CARSON
Jan-15	BRAZIL	501	0.38	190.38	30	15,030.00	CARSON
Jan-15	COLOMBIA	360	0.72	259.2	28.6	10,296.00	CARSON
Jan-15	COLOMBIA	384	0.61	234.24	28.6	10,982.40	CARSON
Jan-15	ECUADOR	322	1.38	444.36	24.5	7,889.00	CARSON

Jan-15	ECUADOR	393	1.37	538.41	24.4	9,589.20	CARSON
Jan-15	IRAQ	389	2	778	27.2	10,580.80	CARSON
Jan-15	IRAQ	456	2	912	27.3	12,448.80	CARSON
Jan-15	IRAQ	602	2	1204	27.2	16,374.40	CARSON
Jan-15	SAUDI ARABIA	166	1	166	40.7	6,756.20	CARSON
Jan-15	SAUDI ARABIA	384	2	768	33.4	12,825.60	CARSON
		58,343		86,920		1,716,129	
				<b>1.49</b>		<b>29.41</b>	
				<b>Weighted Average Sulfur</b>		<b>Weighted Average API gravity</b>	

on Refinery had very few imports (almost all domestic crude)

Dec-15	COLOMBIA	199	1.09	216.91	24.6	4,895.40	WILMINGTON LOS ANGELES
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Jmay CBE Calculations for Tesoro  
LARIC DEIR Report June 2016

SUMMARY BY COUNTRY OF TESORO 2015 IMPORTS

CARSON

RPT_PER IOD	CNTRY_NAME	QUANTITY	SULFUR	APIGRAVITY	For weighted av Sulfur calc	For weighted av API calc
Dec-15	SAUDI ARABIA	626	1.94	33.1	1214.44	20,720.60
Dec-15	SAUDI ARABIA	680	1.94	33.2	1319.2	22,576.00
Dec-15	ANGOLA	222	0.64	29.1	142.08	6,460.20
Dec-15	ANGOLA	464	0.58	29.8	269.12	13,827.20
Dec-15	ANGOLA	695	0.65	29.3	451.75	20,363.50
Dec-15	IRAQ	517	2.51	31.4	1297.67	16,233.80
Dec-15	SAUDI ARABIA	41	1.97	32.1	80.77	1,316.10
Dec-15	SAUDI ARABIA	388	2.48	31.2	962.24	12,105.60
Nov-15	ANGOLA	320	0.43	31.2	137.6	9,984.00
Nov-15	ANGOLA	455	0.43	31.2	195.65	14,196.00
Nov-15	ANGOLA	779	0.3	33	233.7	25,707.00
Nov-15	AUSTRALIA	243	0.32	19.4	77.76	4,714.20
Nov-15	AUSTRALIA	284	0.32	19.4	90.88	5,509.60
Nov-15	IRAQ	347	2.55	31.5	884.85	10,930.50
Nov-15	IRAQ	354	2.54	31.4	899.16	11,115.60
Nov-15	IRAQ	844	2.51	31.4	2118.44	26,501.60
Nov-15	KUWAIT	198	2.62	30.2	518.76	5,979.60
Nov-15	SAUDI ARABIA	48	2.51	30.9	120.48	1,483.20
Nov-15	SAUDI ARABIA	342	2.06	32.7	704.52	11,183.40

APPENDIX G1: RESPONSE TO COMMENTS

Nov-15	SAUDI ARABIA	356	1.92	33.1			683.52	11,783.60
Nov-15	SAUDI ARABIA	391	2.61	30.6			1020.51	11,964.60
Nov-15	SAUDI ARABIA	655	2	32.7			1310	21,418.50
Oct-15	ANGOLA	757	0.29	32.7			219.53	24,753.90
Oct-15	BRAZIL	462	0.27	32.1			124.74	14,830.20
Oct-15	BRAZIL	522	0.27	32.1			140.94	16,756.20
Oct-15	ECUADOR	275	1.74	21			478.5	5,775.00
Oct-15	EQUATORIAL GUINEA	17	0.29	32.7			4.93	555.90
Oct-15	EQUATORIAL GUINEA	768	0.38	32.1			291.84	24,652.80
Oct-15	IRAQ	97	3.22	28.5			312.34	2,764.50
Oct-15	IRAQ	870	3.18	28.4			2766.6	24,708.00
Oct-15	SAUDI ARABIA	225	2.47	31.1			555.75	6,997.50
Oct-15	SAUDI ARABIA	302	2.51	31.1			758.02	9,392.20
Oct-15	SAUDI ARABIA	332	1.18	33.3			391.76	11,055.60
Oct-15	SAUDI ARABIA	536	2.5	31			1340	16,616.00
Sep-15	ANGOLA	613	0.29	32.7			177.77	20,045.10
Sep-15	BRAZIL	354	0.37	30.1			130.98	10,655.40
Sep-15	ECUADOR	100	1.74	20.8			174	2,080.00
Sep-15	ECUADOR	341	1.34	24.9			456.94	8,490.90
Sep-15	ECUADOR	378	1.75	20.7			661.5	7,824.60

APPENDIX G1: RESPONSE TO COMMENTS

Sep-15	EQUATORIAL GUINEA	87	0.29	32.7		25.23	2,844.90
Sep-15	EQUATORIAL GUINEA	157	0.4	32.2		62.8	5,055.40
Sep-15	EQUATORIAL GUINEA	318	0.41	32.3		130.38	10,271.40
Sep-15	EQUATORIAL GUINEA	535	0.4	32.8		214	17,548.00
Sep-15	SAUDI ARABIA	440	1.92	33.8		844.8	14,872.00
Sep-15	ANGOLA	119	0.41	32.3		48.79	3,843.70
Sep-15	ANGOLA	344	0.4	32.2		137.6	11,076.80
Sep-15	ANGOLA	413	0.37	32.6		152.81	13,463.80
Sep-15	ANGOLA	467	0.37	30.6		172.79	14,290.20
Aug-15	ANGOLA	235	0.44	32.8		103.4	7,708.00
Aug-15	ANGOLA	549	0.44	32.8		241.56	18,007.20
Aug-15	ANGOLA	699	0.35	30.8		244.65	21,529.20
Aug-15	BRAZIL	199	0.35	30.3		69.65	6,029.70
Aug-15	BRAZIL	224	0.29	31.4		64.96	7,033.60
Aug-15	BRAZIL	421	0.36	30.5		151.56	12,840.50
Aug-15	ECUADOR	360	1.81	20.4		651.6	7,344.00
Aug-15	ECUADOR	394	1.92	20		756.48	7,880.00
Aug-15	IRAQ	152	3.34	27.8		507.68	4,225.60



APPENDIX G1: RESPONSE TO COMMENTS

Aug-15	IRAQ		377	3.34	27.7			1259.18	10,442.90
Aug-15	IRAQ		390	3.34	27.9			1302.6	10,881.00
Aug-15	SAUDI ARABIA		417	1.97	32.9			821.49	13,719.30
Aug-15	RUSSIA		358	0.54	35			193.32	12,530.00
Aug-15	RUSSIA		385	0.54	35.1			207.9	13,513.50
Jul-15	ANGOLA		443	0.47	24.7			208.21	10,942.10
Jul-15	ANGOLA		465	0.43	24.4			199.95	11,346.00
Jul-15	BRAZIL		381	0.29	31.6			110.49	12,039.60
Jul-15	BRAZIL		424	0.27	31.7			114.48	13,440.80
Jul-15	ECUADOR		393	1.44	24.4			565.92	9,589.20
Jul-15	IRAQ		394	3.1	29.3			1221.4	11,544.20
Jul-15	IRAQ		561	3.1	29.2			1739.1	16,381.20
Jul-15	SAUDI ARABIA		175	1.93	33			337.75	5,775.00
Jul-15	SAUDI ARABIA		689	1.93	33.1			1329.77	22,805.90
Jun-15	ANGOLA		187	0.45	28.5			84.15	5,329.50
Jun-15	ANGOLA		401	0.45	28.6			180.45	11,468.60
Jun-15	BRAZIL		181	0.38	31.8			68.78	5,755.80
Jun-15	BRAZIL		236	0.38	30.7			89.68	7,245.20
Jun-15	BRAZIL		346	0.38	30.9			131.48	10,691.40
Jun-15	BRAZIL		412	0.38	31			156.56	12,772.00

APPENDIX G1: RESPONSE TO COMMENTS

Jun-15	ECUADOR	395	1.35	25.1	533.25	9,914.50
Jun-15	ECUADOR	574	1.36	25.1	780.64	14,407.40
Jun-15	IRAQ	183	3	29.2	549	5,343.60
Jun-15	IRAQ	224	3	29.3	672	6,563.20
Jun-15	IRAQ	291	4	27.5	1164	8,002.50
Jun-15	IRAQ	297	3.1	29.4	920.7	8,731.80
Jun-15	IRAQ	315	4	27.4	1260	8,631.00
Jun-15	IRAQ	683	4	27.4	2732	18,714.20
Jun-15	SAUDI ARABIA	149	2	39.5	298	5,885.50
Jun-15	SAUDI ARABIA	452	2	33.1	904	14,961.20
Jun-15	SAUDI ARABIA	551	2	33.2	1102	18,293.20
May-15	ANGOLA	155	0.45	33	69.75	5,115.00
May-15	ANGOLA	418	0.45	32.6	188.1	13,626.80
May-15	BRAZIL	264	0.38	30	100.32	7,920.00
May-15	BRAZIL	433	0.38	29.8	164.54	12,903.40
May-15	ECUADOR	215	1	25.1	215	5,396.50
May-15	IRAQ	128	4	27	512	3,456.00
May-15	IRAQ	269	3	27.3	807	7,343.70
May-15	IRAQ	271	3.42	27.5	926.82	7,452.50
May-15	IRAQ	398	3.42	27.6	1361.16	10,984.80
May-15	PERU	60	1	18.3	60	1,098.00
May-15	PERU	120	1	21.6	120	2,592.00
May-15	SAUDI ARABIA	386	2.01	32.9	775.86	12,699.40
May-15	SAUDI ARABIA	598	2	33.1	1196	19,793.80
Apr-15	ANGOLA	368	0.45	33	165.6	12,144.00
Apr-15	ANGOLA	476	0.5	28.4	238	13,518.40
Apr-15	BRAZIL	278	0.38	29.9	105.64	8,312.20
Apr-15	BRAZIL	345	0.38	29.9	131.1	10,315.50
Apr-15	BRAZIL	370	0.38	29.9	140.6	11,063.00
Apr-15	ECUADOR	325	1.42	24.4	461.5	7,930.00
Apr-15	IRAQ	199	3.42	27.5	680.58	5,472.50
Apr-15	IRAQ	354	3.42	27.4	1210.68	9,699.60

APPENDIX G1: RESPONSE TO COMMENTS

Apr-15	IRAQ	365	3.42	27.6	1248.3	10,074.00
Apr-15	IRAQ	391	3.42	27.3	1337.22	10,674.30
Apr-15	SAUDI ARABIA	290	2.01	33.2	582.9	9,628.00
Apr-15	SAUDI ARABIA	294	2.01	33	590.94	9,702.00
Apr-15	SAUDI ARABIA	318	2.01	33	639.18	10,494.00
Apr-15	SAUDI ARABIA	350	2	32.8	700	11,480.00
Apr-15	SAUDI ARABIA	384	2.01	32.8	771.84	12,595.20
Mar-15	SAUDI ARABIA	316	1.94	33.2	613.04	10,491.20
Mar-15	ANGOLA	334	0.45	27.3	150.3	9,118.20
Mar-15	ANGOLA	375	0.45	27.3	168.75	10,237.50
Mar-15	BRAZIL	476	0.41	30	195.16	14,280.00
Mar-15	BRAZIL	517	0.41	29.9	211.97	15,458.30
Mar-15	COLOMBIA	308	0.55	31.5	169.4	9,702.00
Mar-15	COLOMBIA	624	0.47	31.5	293.28	19,656.00
Mar-15	ECUADOR	322	1.9	20.2	611.8	6,504.40
Mar-15	ECUADOR	326	1.9	20	619.4	6,520.00
Mar-15	ECUADOR	327	1.83	20.8	598.41	6,801.60
Mar-15	IRAQ	163	3.52	26.6	573.76	4,335.80
Mar-15	IRAQ	197	3.52	26.7	693.44	5,259.90
Mar-15	IRAQ	683	3.52	26.7	2404.16	18,236.10
Mar-15	SAUDI ARABIA	114	1.92	33.1	218.88	3,773.40
Feb-15	ANGOLA	165	0.42	25.1	69.3	4,141.50
Feb-15	ANGOLA	179	0.44	25.2	78.76	4,510.80
Feb-15	ANGOLA	390	0.47	25.3	183.3	9,867.00
Feb-15	ANGOLA	654	0.47	25	307.38	16,350.00
Feb-15	ANGOLA	729	0.42	25	306.18	18,225.00
Feb-15	COLOMBIA	380	0.67	28.1	254.6	10,678.00
Feb-15	ECUADOR	392	1.37	24.5	537.04	9,604.00
Feb-15	ECUADOR	450	1.37	24.3	616.5	10,935.00
Feb-15	IRAQ	347	3.52	27.2	1221.44	9,438.40
Feb-15	IRAQ	572	4	27.2	2288	15,558.40
Feb-15	IRAQ	594	3.62	26.6	2150.28	15,800.40
Feb-15	SAUDI ARABIA	309	1.04	40	321.36	12,360.00
Jan-15	ANGOLA	383	0.43	25.3	164.69	9,689.90

Jan-15	ANGOLA	399	0.43	24.6	171.57	9,815.40
Jan-15	BRAZIL	499	0.39	30	194.61	14,970.00
Jan-15	BRAZIL	501	0.38	30	190.38	15,030.00
Jan-15	COLOMBIA	360	0.72	28.6	259.2	10,296.00
Jan-15	COLOMBIA	384	0.61	28.6	234.24	10,982.40
Jan-15	ECUADOR	322	1.38	24.5	444.36	7,889.00
Jan-15	ECUADOR	393	1.37	24.4	538.41	9,589.20
Jan-15	IRAQ	389	2	27.2	778	10,580.80
Jan-15	IRAQ	456	2	27.3	912	12,448.80
Jan-15	IRAQ	602	2	27.2	1204	16,374.40
Jan-15	SAUDI ARABIA	166	1	40.7	166	6,756.20
Jan-15	SAUDI ARABIA	384	2	33.4	768	12,825.60
TOTAL 2015		58,343			86,920	1,716,129
divided by 365 (in thousand bbls)		159,844				

**1.49**      **29.41**  
 Weighted , Weighted Average  
 Sulfur      API gravity

**IMPORTS**

Dec-15	COLOMBIA	199	1.09	24.6	216.91	4,895.40
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**1.09**      **24.60**  
 Weighted , Weighted Average  
 Sulfur      API gravity

APPENDIX G1: RESPONSE TO COMMENTS

TOTAL PER COUNTRY	Thousand barrels	For weighted av Sulfur calc	Weighted Av sulfur% for each country	For weighted av API calc	For weighted av API calc	Weighted AV API % for each country
Carson						
ANGOLA	13652	5863.24	0.43	400701.5	12521.9	29.4
Australia	527	168.64	0.32	10223.8	10223.8	19.4
BRAZIL	7845	2788.62	0.36	240342.8	10449.7	30.6
Colombia	2056	1210.72	0.59	61314.4	12262.9	29.8
ECUADOR	6282	9701.25	1.54	144475.3	8026.4	23.0
Equatorial Guinea	1882	729.18	0.39	60928.4	12185.7	32.4
IRAQ	13274	41915.56	3.16	374905.6	11026.6	28.2
Kuwait	198	518.76	2.62	5979.6	5979.60	30.2
Peru	180	180	1.00	3690.0	1845.00	20.5
Russia	743	401.22	0.54	26043.5	13021.75	35.1
SAUDI ARABIA	11704	23443.02	2.00	387,523.80	12110.12	33.1
total	58343	66458.56				

APPENDIX G1: RESPONSE TO COMMENTS

2015 US EIA monthly imports to Tesoro LA refinery	Volume to Carson Refinery separated by Country of origin (in thousand barrels 2015)	Volume to Carson Refinery separated by Country of origin (in average barrels per day)	Percent of Carson barrels imported	Weighted Average Sulfur %	SOUR (high sulfur) or SWEET (low sulfur)	Weighted Average API Gravity
ANGOLA	13652	37,403	23.4%	0.43	SWEET	29.4
Australia	527	1,444	0.9%	0.32	SWEET	19.4
BRAZIL	7845	21,493	13.4%	0.36	SWEET	30.6
Columbia	2056	5,633	3.5%	0.59	MODERATE	29.8
ECUADOR	6282	17,211	10.8%	1.54	SOUR	23.0
Equatorial Guinea	1882	5,156	3.2%	0.39	SWEET	32.4
IRAQ	13274	36,367	22.8%	3.16	SOUR	28.2
Kuwait	198	542	0.3%	2.62	SOUR	30.2
Peru	180	493	0.3%	1.00	SOUR	20.5
Russia	743	2,036	1.3%	0.54	MODERATE	35.1
SAUDI ARABIA	11704	32,066	20.1%	2.00	SOUR	33.1
	58343	159,844	100%			
			Overall weighted			
			Av.		1.49	29.41

Smaller contributors: 15,304 9.6%

For Jmay Report, Tesoro DEIR Comments, Table 1:

**Table 1: Tesoro Carson crude imports downloaded from US EIA 2015 data & aggregated**

2015 imports	Volume (average barrels/day, converted from thousand barrels delivered during one month)	Percent of imported	Weighted Average Sulfur %	Weighted Average API Gravity
<b>NEED TO DOUBLECHECK ALL</b>				
Angola	37,403	23.00%	0.43 (Sweet)	29.4 (Moderate)
Iraq	36,367	22.40%	3.16 (Sour)	28.2 (Moderate)
Saudi Arabia	32,066	19.80%	2.00 (Sour)	33.1 (Light)
Brazil	21,493	13.20%	0.36 (Sweet)	30.6 (Light)
Ecuador	17,211	10.60%	1.54 (Sour)	23.0 (Moderate)
Columbia, Equatorial Guinea, Russia	15,304	9.50%	0.32 to 2.62% (Sweet to Sour)	19.4-35.1 (Heavy to Light)
Total barrels import	<b>159,844</b>	100%	Overall Weighted Average S% <b>1.49</b> (Sour)	Overall Weighted Average API <b>29.41</b> (Moderate)

**Table 1: Tesoro Carson crude imports downloaded from US EIA 2015 data & aggregated**

For Jmay Report, Tesoro DEIR Comments, Table 3

Approximations	Average Barrels	Crude Oil	Sulfur	for weighted average	API	for weighted average
Carson Imported Crude	159,844	Mainly from Angola, Iraq, Saudi Arabia, Brazil, Ecuador (Imported Carson crude from EIA 2015 data - see Table 1)	1.49	238138	29.41	4701722
Carson Domestic Crude	97,456	Alaska North Slope (ANS) reported by BP Carson	0.9	87711	32.1	3128343
Wilmington Domestic	104,500	Reported by Tesoro as California San Joaquin & LA Basin, with approximate Sulfur % & API from DEIR Fig. 2-6	1.5	156750	23	2403500
Total LA Complex	363,000	weighted av	1.33	482598	28.19	10233565

Using DEIR Figure 2-6 which shows Wilmington distillation unit mainly in the range from 1.3 to 1.7% sulfur showing Wilmington distillation unit mainly in the range from 21-25° API





## Refinery Information

Tesoro's Los Angeles refinery is located in Los Angeles County, near the Los Angeles Harbor, on approximately 930 acres. The Los Angeles refinery is the largest refinery on the West Coast and is a major producer of clean fuels. At full capacity, it operates at 380,000 barrels per day (bpd). The refinery processes heavy crude from California's San Joaquin Valley and Los Angeles Basin as well as crudes from the Alaska North Slope, South America, West Africa and other international sources. It manufactures gasoline, jet fuel, diesel fuel, petroleum coke, fuel oil, fuel gases, propylene and calcined coke.

The Los Angeles refinery receives crude at its marine terminals in L.A. Harbor and ships products throughout southern California, Arizona and Nevada via its connections to several product distribution pipelines and terminals. It distributes all grades of gasoline and ultra-low-sulfur diesel, primarily to Tesoro's retail system under the ARCO®, Shell®, Exxon®, Mobil®, USA Gasoline™ and Tesoro® brands. Its Watson Cogeneration plant produces 400 MW, and is the largest cogeneration facility in California.

### Fast Facts

- ◆ Los Angeles full-time employees: Approx. 1,450
- ◆ Crude oil capacity: 380,000 bpd

### Environment

- ◆ Partners with Friends of Cabrillo Marine Aquarium.
- ◆ Participates in Sharefest Community Work Day.
- ◆ Partners with the Aquarium of the Pacific.
- ◆ Participates in electronic recycling events.
- ◆ First LEED (Leadership in Energy & Environmental Design) certified building in Carson.

### Health and Safety

- ◆ Received the Meritorious Safety Performance Award from the American Fuel and Petrochemical Manufacturers (AFPM).

### Community Support

- ◆ Sponsors United Way of Greater Los Angeles programs Success by Six and Read Across America.
- ◆ Sponsors and volunteer for Special Olympics Southern California year-round.
- ◆ Sponsors Friends of Banning Park.
- ◆ Sponsors the Youth and Government program at San Pedro/Wilmington YMCA.
- ◆ Partners with Los Alamitos Education Foundation.
- ◆ Provides summer youth and internship programs.

### Contacts:

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 2350 East 223rd Street  
 Carson, CA 90810  
 Community Hotline: (800) 377-2726

## Company Profile

Tesoro Corporation, a Fortune 100 company, is an independent refiner and marketer of petroleum products. Tesoro, through its subsidiaries, operates six refineries in the western United States with a combined capacity of over 875,000 barrels per day and ownership in a logistics business, which includes a 36% interest in Tesoro Logistics LP (NYSE: TLLP) and ownership of its general partner. Tesoro's retail-marketing system includes over 2,300 retail stations under the ARCO®, Shell®, Exxon®, Mobil®, USA Gasoline(TM) and Tesoro® brands.

Excerpt from Tesoro SEC Report available at:

EX-99.1 3 ex99112-31x2014tso10xkreca.htm 2014 RECAST FORM 10-K

<http://www.sec.gov/Archives/edgar/data/50104/000005010415000030/ex99112-31x2014tso10xkreca.htm>

**Refining Segment**

We currently own and operate six petroleum refineries with a combined crude oil capacity of 850 Mbpd located in the western United States and sell transportation fuels to a wide variety of customers. Our refineries produce the majority of the transportation fuels that we sell. We purchase crude oil and other feedstocks from domestic and foreign sources, including the Middle East, South America, Canada, western Africa, and other locations either through term agreements with renewal provisions or in the spot market. Our retail network provides a committed outlet for the majority of the gasoline produced by our refineries; however, we also sell gasoline and gasoline blendstocks, jet fuel, diesel fuel, heavy fuel oils and residual products in both the bulk and wholesale markets in the western United States. We also opportunistically export refined products to certain foreign markets.

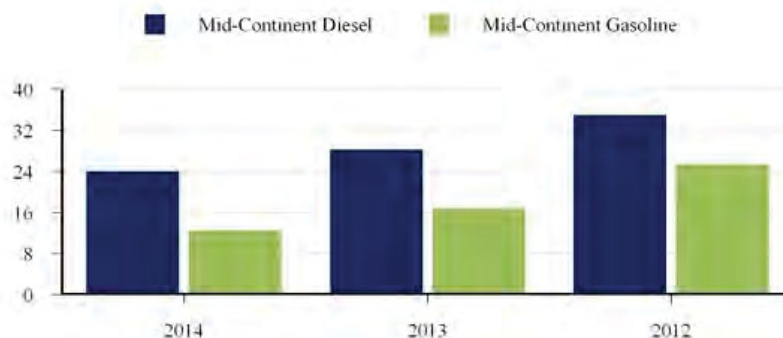
*Market Overview.* Our profitability is heavily influenced by the cost of crude oil and aggregate value of products we make from that crude oil and is affected by changes in economic conditions and supply and demand balance. Product values and crude oil prices are set by the market and are outside of our control.

Our Mid-Continent and Pacific Northwest refineries have benefited from processing inland U.S. and Canada crude oil priced on the basis of West Texas Intermediate crude oil (“WTI”) resulting in discounts compared to benchmark Brent crude oil (“Brent”) processed at our coastal refineries. The WTI discount to Brent averaged approximately \$7 per barrel during 2014, compared to approximately \$11 per barrel during 2013.

We supply our North Dakota refinery exclusively with Bakken crude oil, our Washington refinery primarily with Bakken and Canadian Light Sweet crude oil and our Utah refinery with light sweet crude oil from Wyoming and Colorado as well as Uinta Basin waxy crude oil. In 2014, the average discount of Bakken crude oil to WTI widened to about \$6 per barrel, compared to an average discount of about \$5 per barrel in 2013. The average discount of Canadian Light Sweet crude oil to WTI narrowed to about \$7 per barrel in 2014, compared to approximately \$8 per barrel during 2013. Our California refineries run a significant amount of light crude oil from Alaskan North Slope (“ANS”) and light crude oil from Iraq (“Basrah”) as well as South American heavy (“Oriente”) and San Joaquin Valley Heavy (“SJVH”) crude oil, which have historically priced at a discount to Brent.

The following charts illustrate average benchmark refined product differentials relevant to our markets and compared to WTI or ANS crude oil prices.

**Average Mid-Continent Benchmark  
Product Prices to WTI Prices (\$/barrel)**



Source: PLATTS

5/11/2016

BP agrees to sell Carson refinery and ARCO retail network in US southwest to Tesoro for \$2.5 billion | Press releases | Press | BP Global

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BP: GBP 361.2 (+3.65) USD 31.67 (-0.01) \*




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Press **Press releases** BP agrees to sell Carson refinery and ARCO retail network

G1-1911

# BP agrees to sell Carson refinery and ARCO retail network in US southwest to Tesoro for \$2.5 billion

Release date: 12 August 2012

BP announced today it has reached agreement to sell its Carson, California refinery and related logistics and marketing assets in the region to Tesoro Corporation for \$2.5 billion in cash (including the estimated value of hydrocarbon inventories and subject to post-closing adjustments) as part of a previously announced plan to reshape BP's US fuels business.

"Today's announcement is a significant step in the strategic refocusing of our US fuels business," said Iain Conn, chief executive of BP's global refining and marketing business. "Together with the intended sale of Texas City, this will allow us to focus BP's operations and investments exclusively on our three northern US refineries, which are crude feedstock advantaged, and their large and important marketing businesses."

5/11/2016

BP agrees to sell Carson refinery and ARCO retail network in US southwest to Tesoro for \$2.5 billion | Press releases | Press | BP Global

Subject to regulatory and other approvals, Tesoro will acquire the 266,000 barrel per day refinery near Los Angeles as well as the associated logistics network of pipelines and storage terminals and the ARCO-branded retail marketing network in Southern California, Arizona and Nevada. The sale also includes BP's interests in associated cogeneration and coke calcining operations. The closing is expected to happen before mid-2013.

"As an established refiner and marketer, Tesoro provides a strong future for the business and for its employees," said Conn.

BP will sell the ARCO retail brand rights and exclusively license those rights from Tesoro for Northern California, Oregon and Washington and continue to produce transportation fuels at its Cherry Point, Washington refinery. BP will also retain ownership of the amp m convenience store brand and franchise it to Tesoro for use in the Southwest.

In February 2011 BP announced plans to refocus its refining and marketing business on its northern US refineries and find buyers for Carson and the Texas City Refinery in Texas.

"We are pleased to be delivering on the plan we announced last year and when complete we will have a smaller, but well-positioned and very competitive portfolio of refining and marketing businesses in the US," Conn added. "BP remains committed to supplying US customers with the fuels, lubricants and petrochemicals they depend on while at the same time delivering long-term growth and profits to our shareholders. We are investing heavily in the capabilities of our businesses in line with that commitment."

BP is nearing completion of a multi-billion dollar upgrade at its Whiting Refinery in Northwest Indiana. The largest private sector investment in Indiana history, the project will transform Whiting's crude processing capabilities and is expected to be completed in the second half of 2013. The company is also upgrading the Cherry Point Refinery to produce cleaner burning diesel fuel and investing in a cleaner gasoline project at its joint-venture refinery near Toledo, Ohio.

Today's announcement brings the total value of the divestments that BP has agreed since the beginning of 2010 to \$26.5 billion. This is part of the previously announced programme to divest \$38 billion of assets by the end of 2013.

### About BP in the US:

BP has invested more in the United States over the last five years than any other oil and gas company. With more than \$52 billion in capital spending between 2007 and 2011, BP invests more in the US than in any other country. The company is the second largest producer of oil and gas in the US, a major oil refiner and a leader in alternative energy

BP agrees to sell Carson refinery and ARCO retail network in US southwest to Tesoro for \$2.5 billion | Press releases | Press | BP Global sources including wind power and biofuels. BP provides enough energy each year to light the entire country. With 23,000 US employees, BP supports nearly a quarter of a million domestic jobs through its business activities. For more information visit [www.bp.com](http://www.bp.com).

### Notes to editors:

- The price of the assets is \$1,175 million, plus the value of inventory at the time of closing. At current prices, the inventory is valued at approximately \$1,300 million.
- The 266,000 barrel per day (bpd) Carson Refinery is one of the largest on the US West Coast. It became part of BP through the 2000 acquisition of ARCO. It employs over 1,100 staff and in total the divested business employs approximately 1,700 staff.
- The transaction includes the refinery and integrated terminals and pipelines, as well as marketing agreements with about 800 retail sites in Southern California, Arizona and Nevada.
- The refinery is located on 650 acres in Los Angeles County, near the Long Beach and Los Angeles Harbours. The refinery began operations in 1938. It processes crude oil from Alaska's North Slope, the Middle East, West Africa and other sources. Processing equipment includes the largest fluid catalytic cracker in California, two cokers and distillate hydrocracking.
- BP's 51 per cent interest in a nominal 400 megawatt cogeneration facility located at the refinery is included in the sale.
- BP's Wilmington Coke Calciner located about five miles from the refinery is also part of the sale. The plant occupies about 17 acres. The plant employs approximately 40 people and produces 350,000 tonnes of calcined coke per year.
- Logistics assets included in the sale include ownership of Berth 121 facility improvements and equipment, Marine Terminals 2 and 3 and the LA basin pipelines system that moves crude, products and intermediates to and from the refinery.
- Terminals included in the sale are Carson Crude, East Hynes, West Hynes, Hathaway, Carson Products, Colton, Vinvale and San Diego.
- BP is currently in the process of carrying out a number of major investments in its other US refineries, including a large investment programme to upgrade its 413,000 bpd capacity Whiting, Ind., refinery; a clean-diesel upgrading project at its 234,000 bpd Cherry Point, Wash., refinery; and the addition of a continuous catalytic reformer to the 160,000 bpd capacity Toledo, Ohio, refinery (a 50:50 joint venture with partner Husky Energy Inc.).

### Cautionary Statement:

<http://www.bp.com/en/global/corporate/press-releases/bp-agrees-to-sell-carson-refinery-and-arco-retail-network-in-us-southwest-to-tesoro-for-25-billion.html>

This release contains certain forward-looking statements, including statements on the expected timing of completion of BP's disposal of its Carson refinery and related logistics and marketing assets in the U.S. Southwest; the intended sale of the Texas City refinery; upgrades of its Whiting, Cherry Point and Toledo refineries; BP's divestment program and other statements which are generally, but not always, identified by the use of words such as 'want', 'intended to', 'expected to', and similar expressions. Forward-looking statements involve risks and uncertainties because they depend on circumstances that will or may occur in the future. Actual results may differ materially from those expressed in such statements, depending on a variety of factors, including general economic conditions; the actions of regulators and other factors discussed in BP's Second Quarter Results 2012 (SEC File No. 1-06262) as filed with the United States Securities and Exchange Commission.

**Further information:**

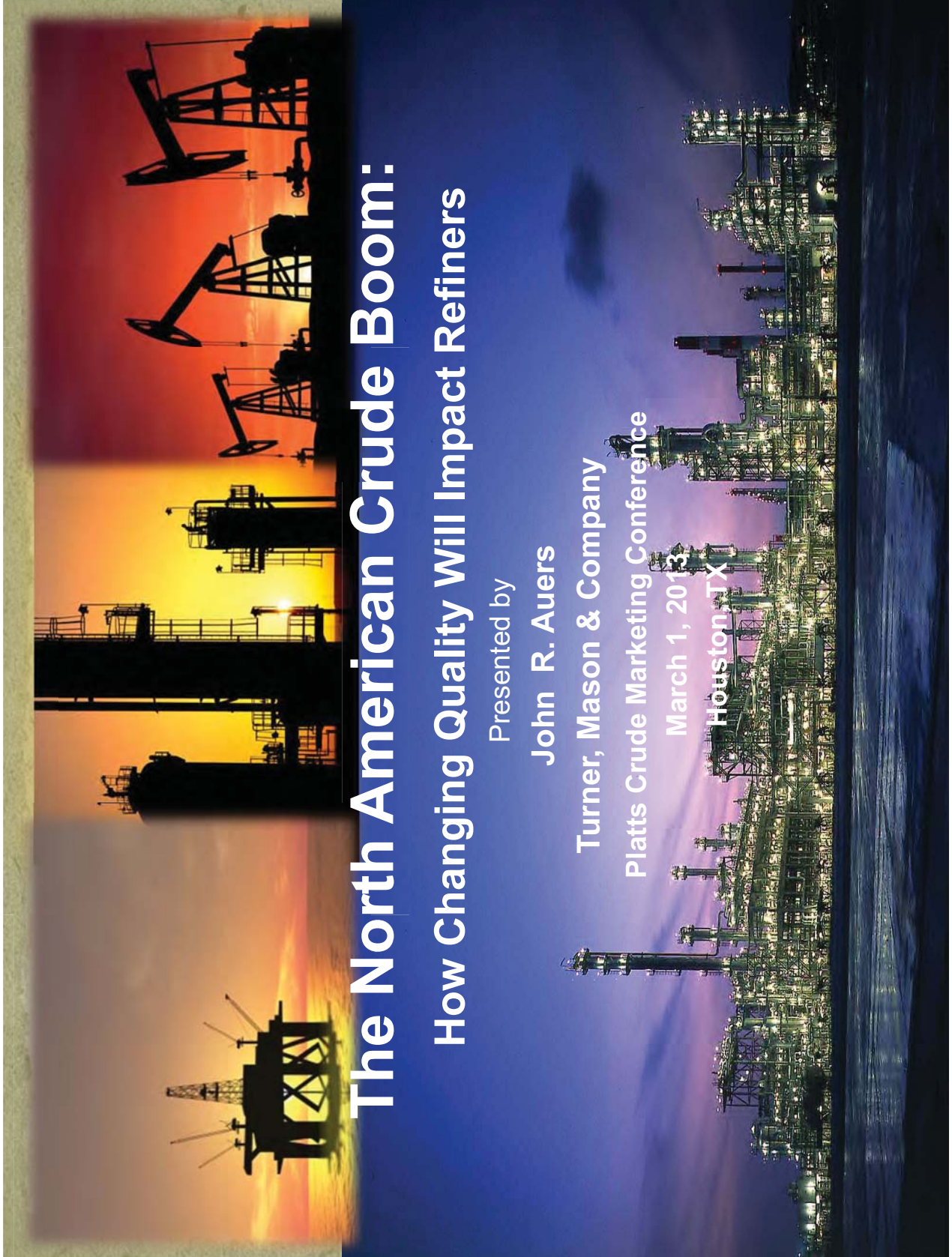
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<http://www.bp.com/en/global/corporate/press-releases/bp-agrees-to-sell-carson-refinery-and-arco-retail-network-in-us-southwest-to-tesoro-for-25-billion.html>



# The North American Crude Boom:

## How Changing Quality Will Impact Refiners

Presented by

John R. Auers

Turner, Mason & Company

Platts Crude Marketing Conference

March 1, 2013

Houston, TX



# Turner, Mason & Company

- ❖ International consulting practice since 1971
- ❖ Downstream focus; refinery/chemical engineers
- ❖ Industry and financial clients
- ❖ Publish various outlook and forecast products
  - Crude and Refined Products Outlook
  - Refinery Construction Outlook
  - World Crude Oil Outlook
  - Special Studies

## North American Crude Outlook

- ❖ Detailed regional production forecasts
- ❖ Updates of refinery demand by facility/region
- ❖ Analysis of required logistics
- ❖ Evaluate challenges and opportunities for producers and refiners and midstream operators
- ❖ Initial publication – June 2012
- ❖ Update issued in October 2012
- ❖ Next edition scheduled for release in June 2013

# Presentation Agenda

• Crude Production Forecasts

• Changes in Crude Quality

• Implications for Refiners

## History of NA Crude Production

- ❖ U.S. production up by about 2 MMBPD since 2008
  - Reverses 20+ year trend of declines
  - Comes despite slowdown in Gulf after Macondo
- ❖ Canadian crude on upward trend for 3 decades
  - Up by almost 1 million BPD in the last decade
  - Largest reserve base in the world/unconventional resources
  - Almost all reserves located in Western Canada
- ❖ Driven by high prices and technology advances

## Production Forecasts

- ❖ US forecasts differ widely
  - All credible forecasts show continued strong growth
  - Most expect 2020 production to be 9 to 11+ MMBPD
  - Growth levels beyond 2020 even more uncertain
  
- ❖ Canadian production forecasts less variable
  - Resource base is better understood
  - Dependent on price/ability to remove logistical limits
  - Expect 4.5 MMBPD by 2020 (50% above 2011)

# Production Forecasts (cont.)

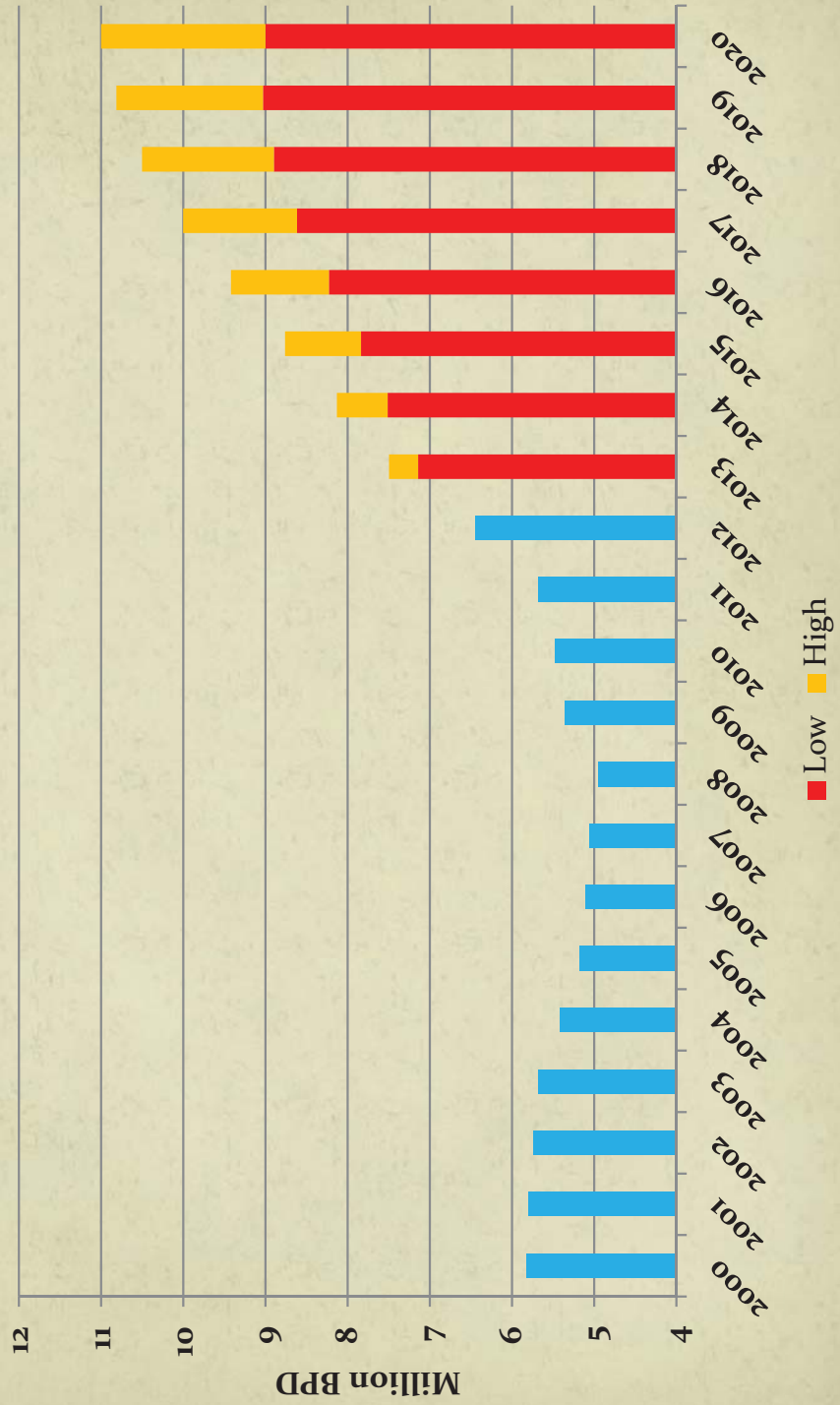
## ❖ Where/What Type?

- U.S. growth mostly in PADDs 2 and 3
- Declines in Alaska/California to continue
- Predominantly light sweet
- Canadian growth primarily in the West
- Vast majority heavy sour

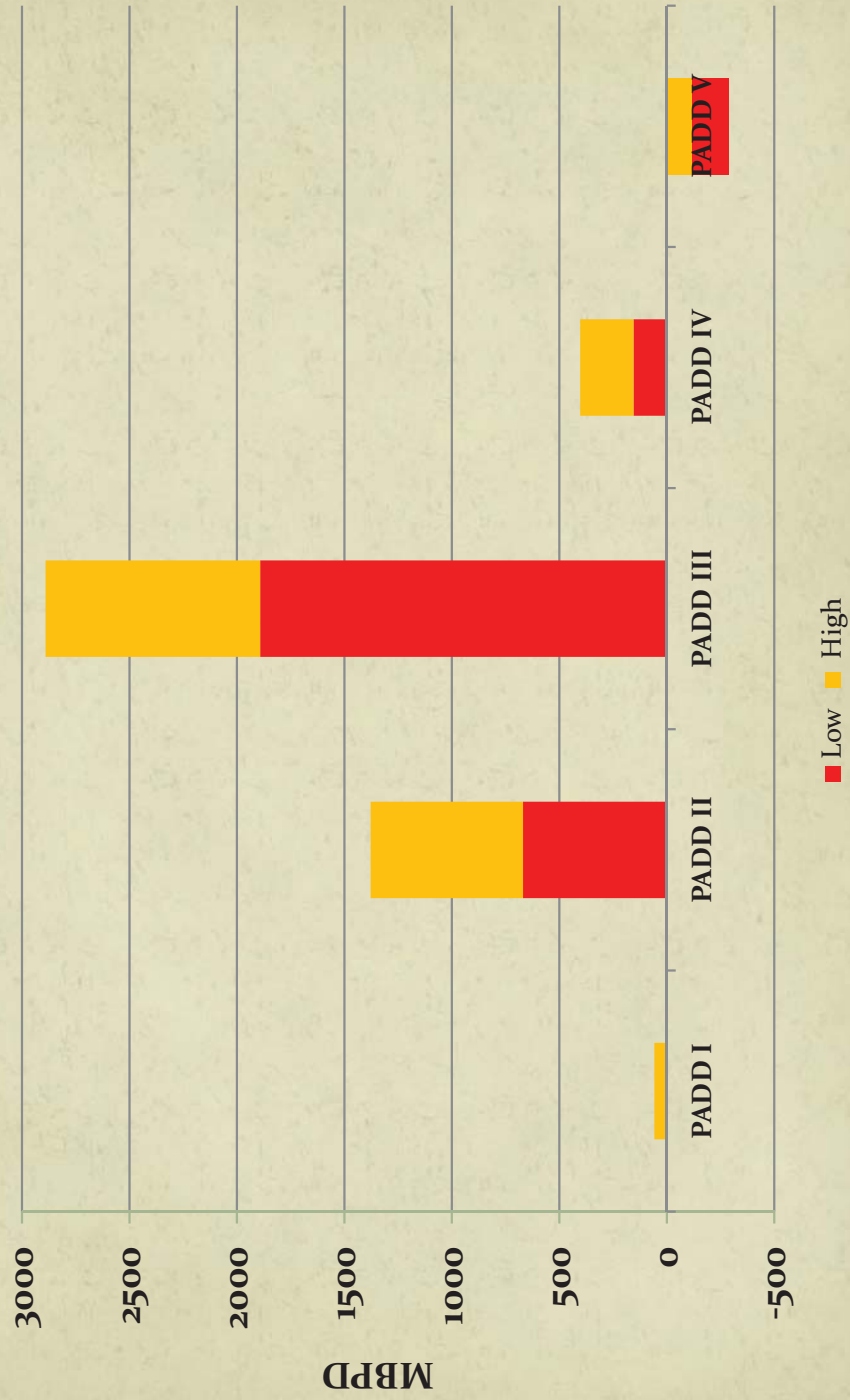
## ❖ Production dependent on key assumptions

- Crude prices – both absolute and regional
- Production potential of tight oil plays very uncertain
- Prospective fields (Utica, Tuscaloosa, SCOOP) even harder to forecast
- Various limitations (manpower, materials, regulatory, etc.) affect growth
- Ability to move crude to markets in timely and cost effective ways will be particularly critical

# U.S. Crude Production Forecast

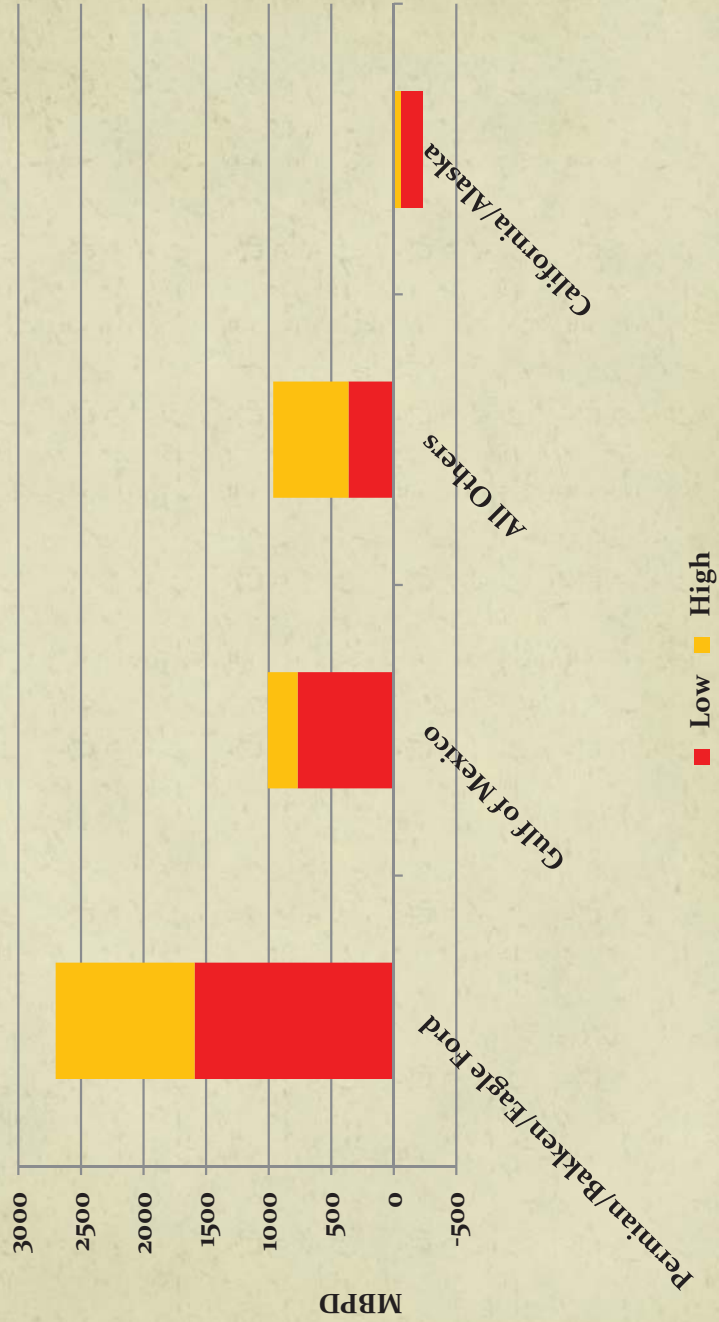


# U.S. Crude Production Change by PADD 2012 to 2020

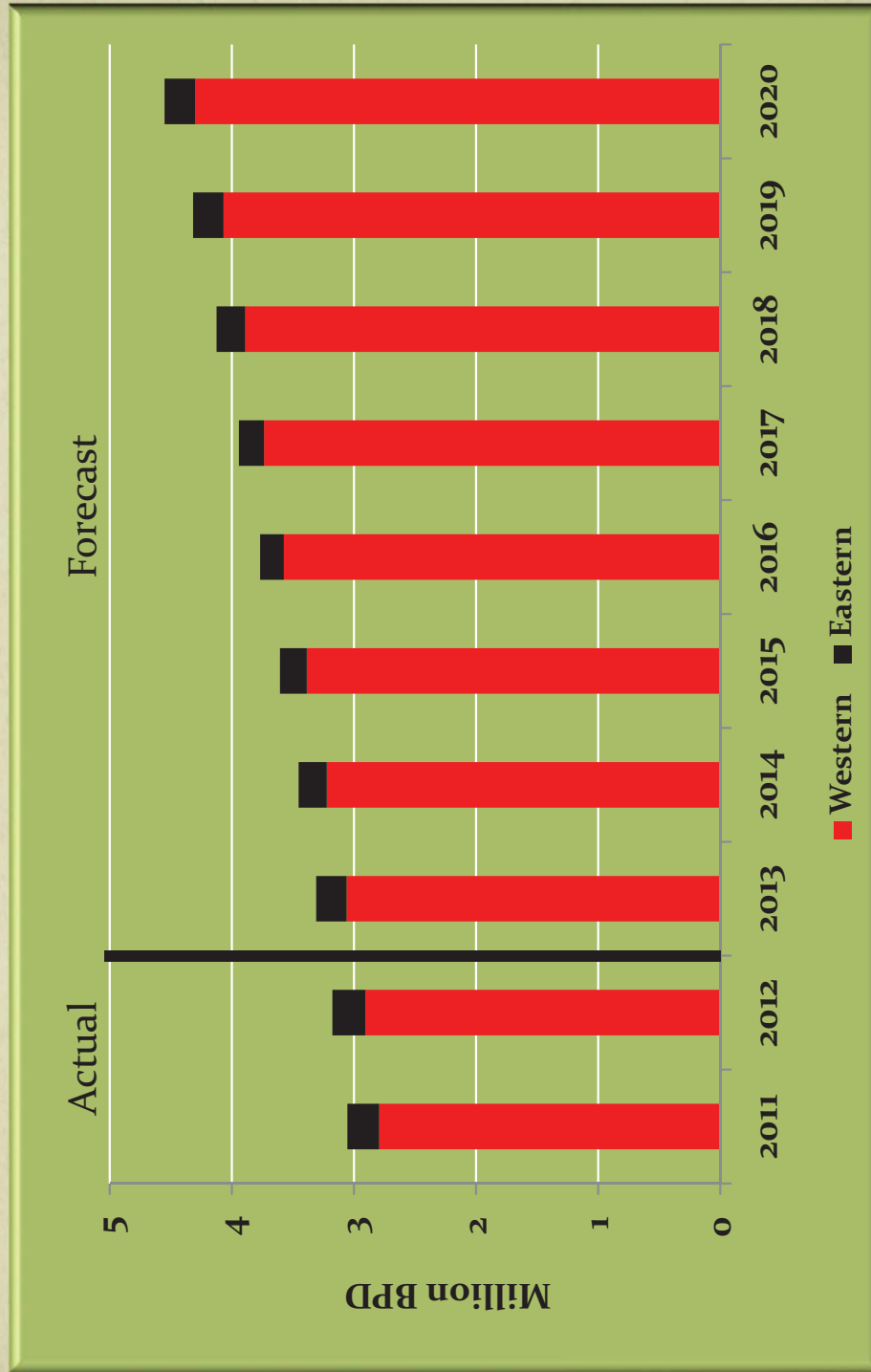




# U.S. Crude Production Change by Area 2012 to 2020



# Canadian Crude Production Forecast



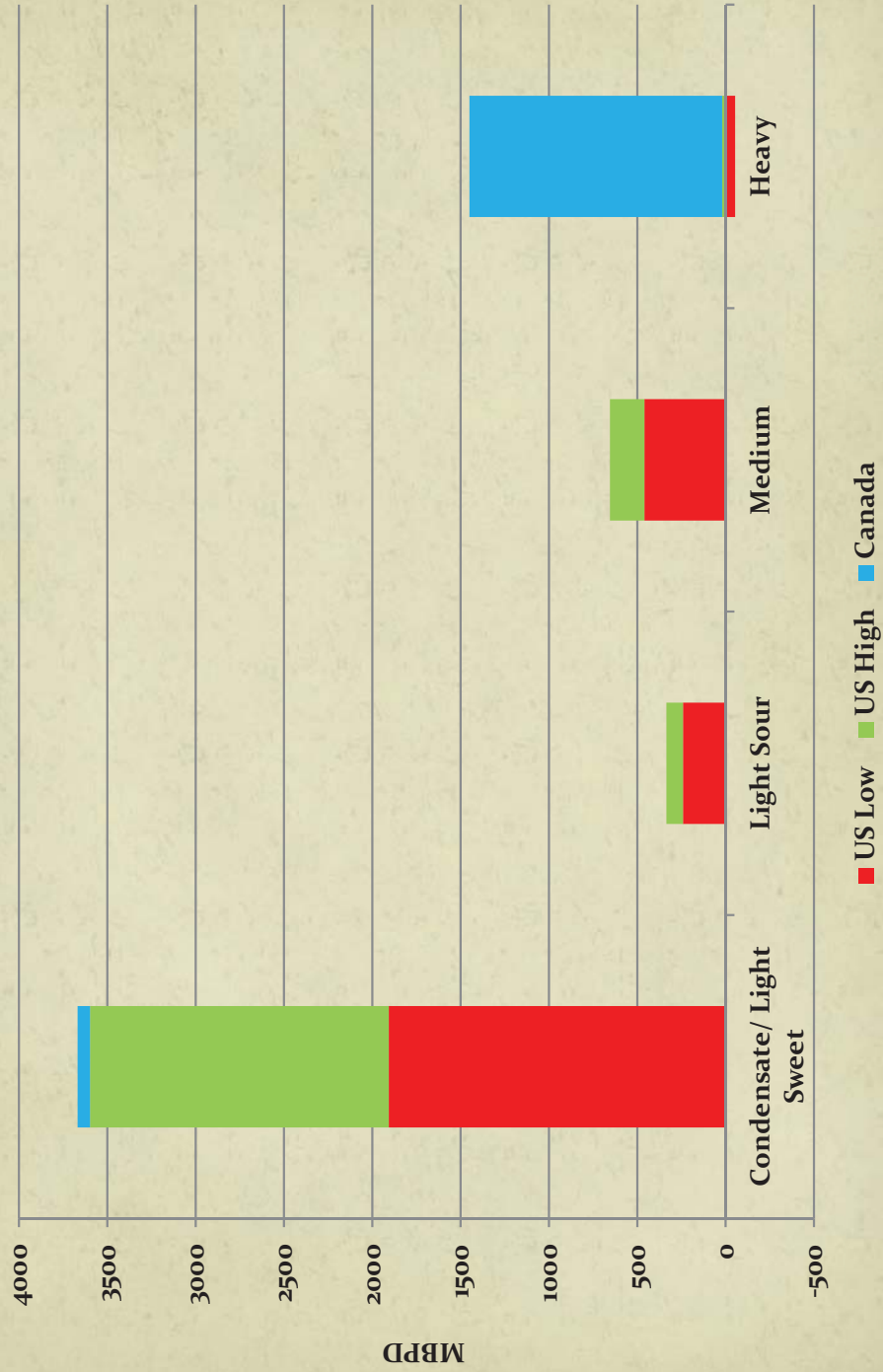
## Presentation Agenda

- Crude Production Forecast
- Changes in Crude Quality
- Implications for Refiners

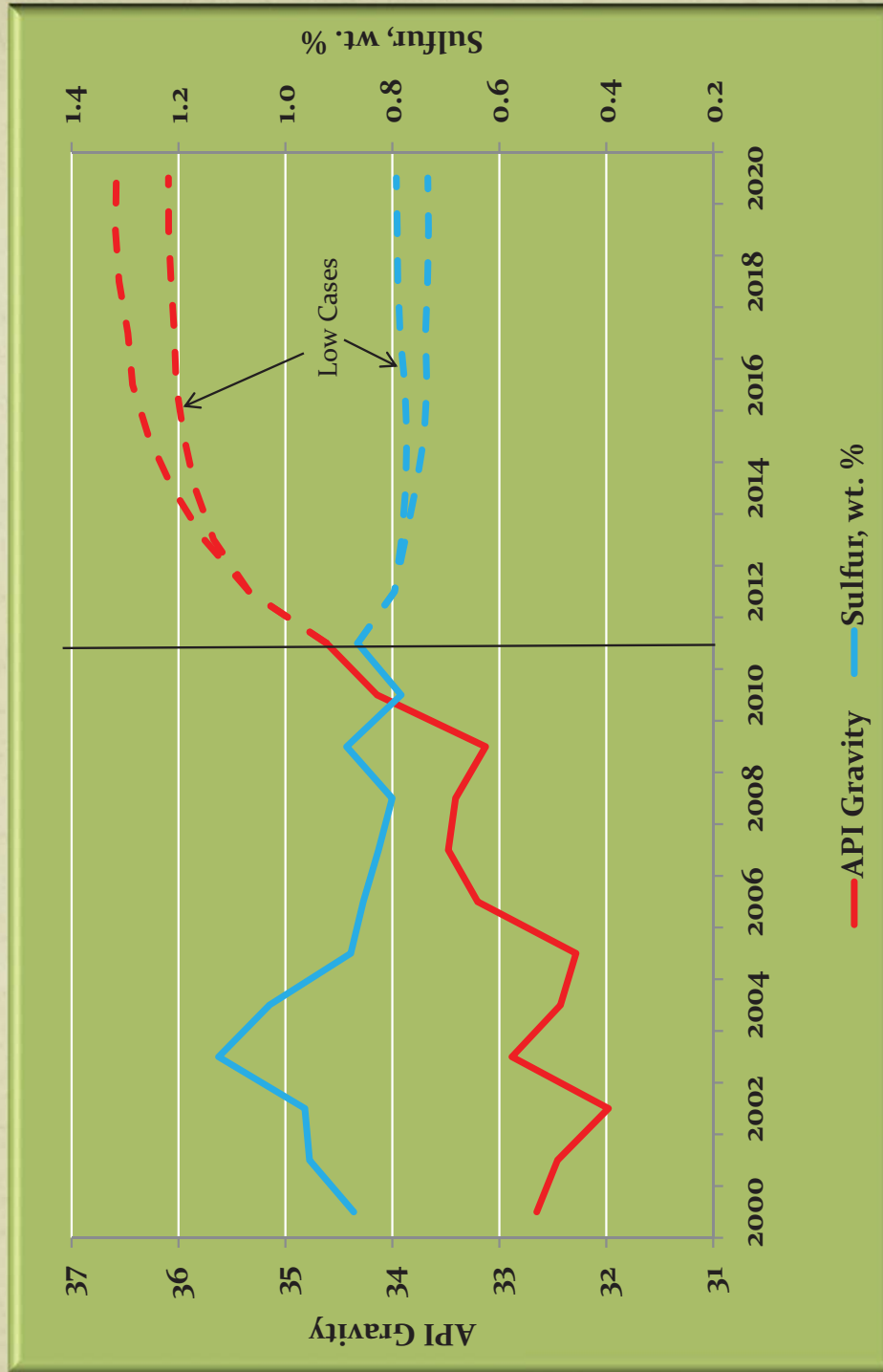
# TM&C Crude Quality Categories

	Gravity °API	Sulfur Wt. %
Condensate	≥ 55.0	All
Super Light	≥ 42.0	All
Light Sweet	31.0 – 42.0	≤ 0.99
Light Sour	31.0 – 42.0	≥ 1.00
Medium	24.0 – 31.0	All
Heavy	≤ 24.0	All

# Change in Crude Production by Grade 2012 to 2020



# Quality of U.S. Crude Oil Production



## PADD II Heavy Crude Projects Add to Light Crude Surplus

Refinery	Year	Crude Demand Impact MBPD	
		Light	Heavy
COP/Cenovus Wood River	2012	-95	+130
Marathon/Detroit	2012/13	-65	+80
BP/Whiting	2013	-220	+260
BP/Husky Toledo	2015	-45	+60
<b>Total</b>		<b>-425</b>	<b>+530</b>

# API Gravity of U.S. Refinery Crude Slate





## Other Crude Quality Parameters

- ❖ API gravity/sulfur not especially meaningful to refiners
  - ❖ Easy to measure and categorize
  - ❖ More valuable as commercial parameter
- ❖ Distillation yields most important
  - ❖ Determine how much finished product can be made
  - ❖ Determine how much can be processed based on unit capacity limits
- ❖ Finished product blending qualities/feedstock properties
  - ❖ Impact finish product make/operating yields at downstream units
  - ❖ Seasonality can be important
- ❖ Properties impacting processing
  - ❖ TAN, salt, chlorides, impurities, BS&W, others
- ❖ Others
  - ❖ Consistency, etc.

# Key Component Qualities

<u>Component</u>	<u>Property</u>	<u>Purpose</u>
Light Straight Run	RON RVP	Gasoline Blending
Heavy Naphtha	N+A	Reformer Feed
Kerosene	Sulfur Freeze Smoke Pt.	Jet Fuel Blending
Diesel	Sulfur API Gravity Cetane Cloud Pt.	Diesel Blending
Gas Oil	Sulfur API Gravity K Factor/Aniline Pt. Nitrogen Metals	FCCU or Hydrocracker Feed
Resid	API Gravity Sulfur Concarbon Metals Viscosity Penetration Asphaltene Content	Coker Feed, Fuel Oil Blending, Asphalt Blending, Resid Cracker Feed

## Shale Crude vs Displaced Light Imports

Property	Bakken	Eagle Ford	Soyo	Bonny Light
API Gravity	41	45	39	34
Sulfur, wt%	0.20	0.60	0.14	0.24
Distillation Yield, volume %				
Lt. Ends, C <sub>1</sub> -C <sub>4</sub>	3.5	3.8	2.1	1.3
Naphtha	35.7	40.1	23.5	20.3
Middle Distillates	30.9	29.7	34.5	45.5
Gas Oil	24.8	21.2	31.1	27.4
Vacuum Residue	5.2	5.2	8.7	5.4

## Heavy Canadian Crude Quality Shift

Property	Current	2020	Change
API Gravity	20.3	20.3	- -
Sulfur, wt%	3.4	3.5	0.1
TAN, mg KOH/gm	1.15	1.50	0.35
Distillation Yield, volume %			
Lt. Ends, C <sub>1</sub> -C <sub>4</sub>	2.7	4.9	2.2
Naphtha	14.0	14.9	0.9
Middle Distillates	21.7	17.8	-3.9
Gas Oil	33.7	31.2	-2.5
Vacuum Residue	27.8	31.1	3.3

## Canadian Heavy vs. Latin Heavies

Property	Canadian Heavy (Current)	Canadian Heavy (2020)	Mexican Maya	Venez. Merey
API Gravity	20.3	20.3	20.5	16.0
Sulfur, wt%	3.4	3.5	3.7	2.5
TAN, mg KOH/gm	1.15	1.50	0.20	0.70
Distillation Yield, volume %				
Lt. Ends, C <sub>1</sub> -C <sub>4</sub>	2.7	4.9	0.9	0.1
Naphtha	14.0	14.9	16.0	7.1
Middle Distillates	21.7	17.8	23.1	24.1
Gas Oil	33.7	31.2	27.0	34.2
Vacuum Residue	27.8	31.1	33.0	34.5

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## Presentation Agenda

- Crude Production Forecast
- Changes in Crude Quality
- Implications for Refiners

# Yield Impacts

- ❖ “Dumbelling” of Crude Slate
  - Higher LPG and naphtha yields
  - Lower middle distillate yields
  - Resid yields up in Canadian heavy crudes; still generally lower than in Latin heavy
- ❖ Implications
  - Higher LPG yield adds to surplus from field production
  - Higher naphtha runs counter to declining domestic gasoline demand/potential lower aromatics limits
  - Distillate demand growing faster than gasoline
  - Will lead to increasing exports of LPG's/gasoline; decreasing ability to export diesel
- ❖ Remedies
  - Construction of hydrocracking units – very capital intensive
  - Development of LPG and gasoline export markets
  - Export of particularly problematic crudes – export limitations; condensate splitting
  - Incentivize high distillate yielding GTL projects

## Operating Impacts

- ❖ Influx of light/super light crude could reduce capacity
  - Loss could be 10%+ at refineries designed for heavier crudes
  - Units impacted include crude units, gas plants, debutanizers, naphtha units, others
  - Displacement of higher sulfur crude will impact sulfur units
  - We do expect economic incentives will result in necessary investment being made
  - Solutions will be refinery specific; could require new crude units, preflash towers, expansion of naphtha HDS, etc.
- ❖ Other concerns
  - Higher TAN from Canadian dilbits will require capital/treating costs; could limit volumes at certain refineries
  - Potential compatibility issues associated with blending dissimilar crudes
  - Loss of access to imports will decrease crude slate flexibility
- ❖ Benefits
  - Lower resid yield/metals content of shale oil will facilitate resid cracking
  - Sulfur plant limited refineries will benefit from sweeter crudes



## Specific Issues - Shale Crudes

- ❖ Bakken
  - Very high level of reformer feed (30%) causes naphtha handling issues
  - Does have decent distillate yield and blending properties
  - Good resid cracker feed properties; fits well with East Coast refineries
  - Refining value a bit higher than Brent and WTI, lower than LLS
- ❖ Eagle Ford
  - Probably the most challenging for refiners; rapid growth/high volume of lights
  - Condensate (> 55 API) particularly difficult; contains over 60% naphtha or lighter
  - Refining value several dollars per barrel below LLS
- ❖ Others
  - Growing Permian production 2 or 3 API numbers higher than historical WTI
  - Niobrara appears to be a bit heavier than other shale crudes (<40 API)
  - Utica likely to be similar to Eagle Ford; very light/significant condensate

## Price/Profitability Impacts

- ❖ US refiners will enjoy crude cost advantage
  - As light imports disappear, LLS flips to permanent discount vs. Brent this year
  - Domestic light crudes priced to incentivize USGC refiners to replace imported medium crude barrels
  - If exports continue to be restricted, discount grows when all possible imports are displaced
- ❖ Regional differentials
  - Inland refiners continue to be most advantaged
  - Pipeline access to USGC will decrease WTI/LLS spread
  - St. James becomes price setting location
  - Economics for EC and WC refiners improve as they gain access
- ❖ Heavy crude discount grows when Canadian crude arrives on USGC
- ❖ Profitable opportunities for light/heavy crude blending have developed

# ANS Blending Opportunity

	WCS/Bakken	ANS	Delta
Bakken, %	55%		
WCS, %	45%		
API Gravity	32.1	32.1	0.0
Sulfur, wt%	1.4	0.9	+0.5
TAN, mg/KOH	0.6	0.1	+0.5
LV% Yields			
C4-	3%	4%	-1%
Naphtha	26%	26%	
Kero/Diesel (665 EP)	27%	27%	
Gas Oil (1050 EP)	28%	27%	+1%
Resid (1050+)	16%	16%	

## ANS Blending Opportunity - Pacific Northwest

Market Prices, \$/B	2011	2012	Jan 2013
ANS (Long Beach)	110.01	111.15	109.98
Bakken (Clearbrook)	98.26	88.90	91.23
WCS(Hardisty)	79.25	72.25	59.19
Estimated Blending Profitability*	\$12 to \$15/B	\$21 to \$25/B	\$25 to \$29/B

\*Assuming unit train rail transportation for Bakken and TM P/L transportation for WCS and allowing for estimated quality differential between WCS/Bakken blend and ANS.

# Questions

# Presenter

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# Forward Looking Statements



**TESORO**

- This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to, among other things:
  - The execution and effects of our strategic priorities, including achieving improvements in operational efficiency and effectiveness including safety performance, developing commercial excellence, and maintaining financial discipline and a high performing culture;
  - The market outlook, including expectations regarding crude oil production growth, feedstock costs, differentials, spreads, import and export opportunities, the Tesoro index and the anticipated costs of crude movements;
  - The timing, value and type of expected synergies from our acquisition of BP's Southern California refining and marketing business in June 2013 and the capital expenditures needed to realize such synergies, as well as our California emissions and the impact of the California regulatory environment;
  - Tesoro's competitive position and competitive advantages, including its advantaged feedstock position, the costs, benefits and timing of projects designed to enhance gross margin capture, earnings diversification and marketing optimization through brand expansion and growth;
  - West Coast logistics development, transportation advantages and refining system opportunities;
  - The timing and results of Tesoro's disciplined improvement program;
  - The results of Tesoro's logistics growth strategy, including plans for Tesoro Logistics LP ("TLLP"), the potential value of possible future asset sales to TLLP, TLLP's organic growth opportunities, the value to Tesoro of distributions from TLLP, the implied enterprise value of TLLP and the value of Tesoro's stake in TLLP;
  - Maintenance of Tesoro's financial priorities, including balance sheet strength, Tesoro's target debt capitalization, and TLLP's target debt to EBITDA level;
  - Capital expenditures, turnaround spending, and the cost, timing and return on capital projects, including expectations regarding incremental EBITDA improvements;
  - Expectations regarding free cash flow, the implementation of Tesoro's cash strategy and the return of excess cash flow to shareholders through dividends and share repurchases; and
  - Growth opportunities for both Tesoro and TLLP.
- We have used the words "anticipate", "believe", "could", "estimate", "expect", "intend", "may", "plan", "predict", "project", "should", "will" and similar terms and phrases to identify forward-looking statements in this Presentation.
- Although we believe the assumptions upon which these forward-looking statements are based are reasonable, any of these assumptions could prove to be inaccurate and the forward-looking statements based on these assumptions could be incorrect. Our operations and anticipated transactions involve risks and uncertainties, many of which are outside our control, and any one of which, or a combination of which, could materially affect our results of operations and whether the forward-looking statements ultimately prove to be correct.
- Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in our filings with the SEC. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this Presentation.
- We have included various estimates of EBITDA and free cash flow, each of which are non-GAAP financial measures, throughout the presentation. Please see Appendix for the definition and reconciliation of these EBITDA and free cash flow estimates.



# Strategic Priorities



**TESORO**

## Operational efficiency and effectiveness

- Safety and reliability
- Cost leadership
- System improvements

- Commercial excellence
- Financial discipline
- Value-driven growth
- High performing culture



**Enduring commitment to execution**

# 2011 – 2013 Transformation



**TESORO**



- Salt Lake waxy crude oil and capacity/yield project
- Mandan capacity and yield projects



- Transformational Los Angeles acquisition, creating world scale refining complex
- Sale of Hawaii business



- Increased supply of advantaged crude oil
- Anacortes unloading facility



- Added ARCO®, Exxon® and Mobil® brands



- \$2 billion of asset proceeds from TLLP
- Acquisition of Northwest Products System

**Strong foundation, positioned for significant value creation**

# Tesoro

Key Metrics	2010	2013
Enterprise Value (\$ billions)	3.5	10.5
Market Cap (\$ billions)	2.0	7.8
Refining Capacity (MBD)	665	850
Refining Complexity	9.8	11.5
Branded Retail Stations	880	2,265
Marketing Integration (%)	53	86
Employees	5,300	7,100
Retail Sales (3Q13 MBD)	87	270

As of 3/31/10 and 11/30/2013



San Antonio  
Headquarters

# Performance Objectives



- Deliver California synergies
- Enhance gross margin
- Improve the base
- Grow logistics
- Maintain financial discipline

**Transformation through Distinctive Performance**

# Market Outlook - Overview



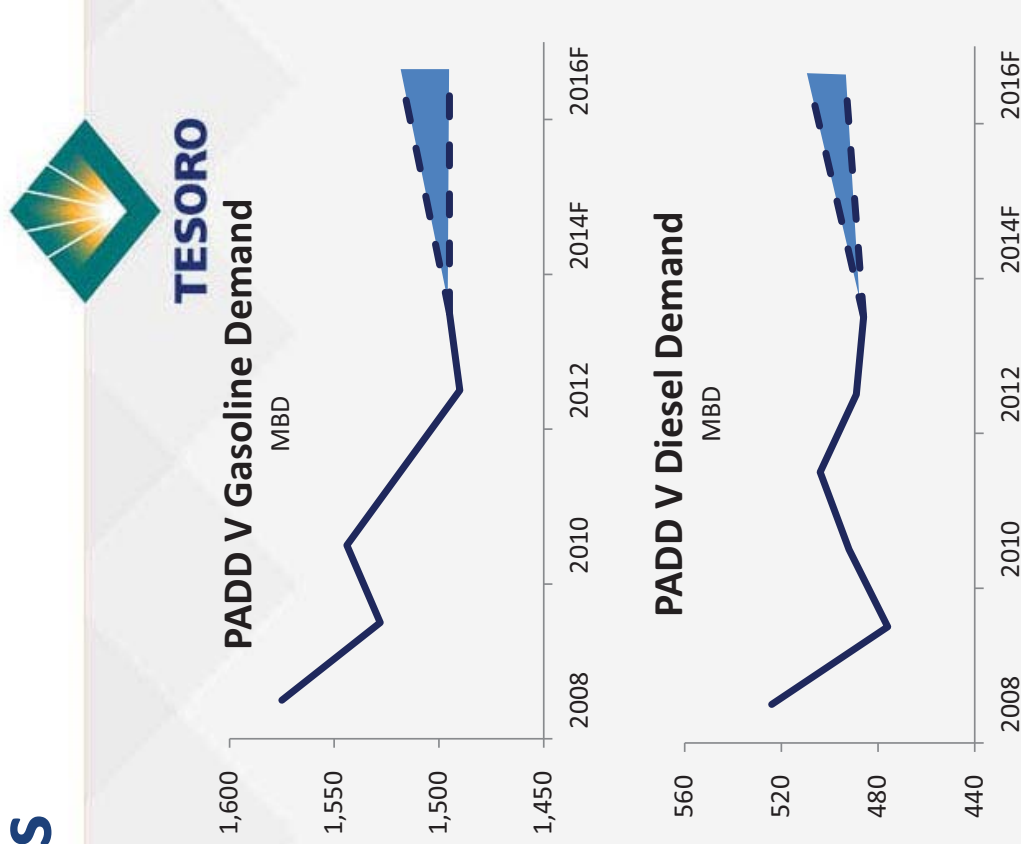
**TESORO**

Key Drivers	Tesoro's View
Global Economic Outlook	Moderate growth
U.S. Economic Outlook	2 – 2.5% GDP growth
Global Refining Capacity	Capacity exceeds demand
U.S. Refining Utilization	High due to low feedstock and natural gas prices
U.S. Crude Oil Supply	Strong growth in North American crude oil production
World Product Demand Growth	Gasoline ~1%; diesel ~2% per year
U.S. Product Demand Growth	Gasoline flat; diesel ~1% per year
U.S. Product Exports	Strong and growing supported by U.S. competitive position
Renewable Fuel Growth	Delays in development of advanced fuels
Regulatory Environment	Challenges and uncertainty

Source: Internal Tesoro estimates.

# PADD V Fundamentals

- Gasoline demand expected to grow 0 to 0.5% annually through 2016
- Diesel demand expected to grow 1.0% annually
- Net clean product exports expected to remain 100-150 MBD
- California unemployment 8.7%, down from over 10% last year
- Tesoro's gasoline refining production is highly integrated with marketing



**West Coast economy improved and demand stabilizing**

Source: EIA monthly data, forecast based on internal Tesoro forecasts.

# Distinctive Performance Objectives



**TESORO**

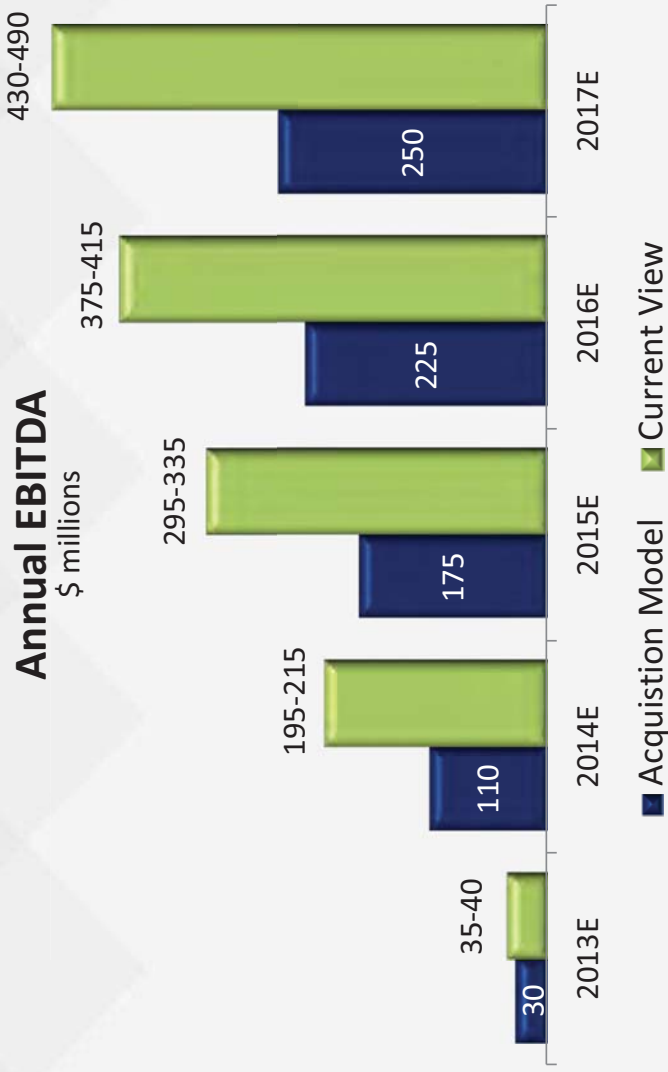
- Distinctive Performance Objectives

\$ million	2014	2015
Deliver California Synergies	160 – 180	260 – 300
Enhance gross margin	140 – 160	250 – 290
Improve the base	70 – 90	80 – 120
<b>Annual EBITDA Improvement<sup>1</sup></b>	<b>370 – 430</b>	<b>590 – 710</b>

- Grow logistics
  - Grow EBITDA by \$200 million by 2015
  - Deliver incremental Tesoro shareholder value of \$1 billion
- Maintain financial discipline
  - Maintain balance sheet strength, drive toward investment grade
  - Invest free cash flow in high-return capital projects
  - Return excess cash to shareholders

<sup>1</sup>) Improvements over 2013 results.

# California Synergy EBITDA



- Feedstock Advantage
- Logistics Optimization
- Production Optimization
- Operating Cost Improvements

**Synergy value and pace of capture significantly improved**



# California Synergy Capital Expenditures



- **Los Angeles Refinery Integration Project**

- Optimizes processing capability
- Provides 30-40 MBD product flexibility
- Reduces CO2 emission 500,000 tons per year

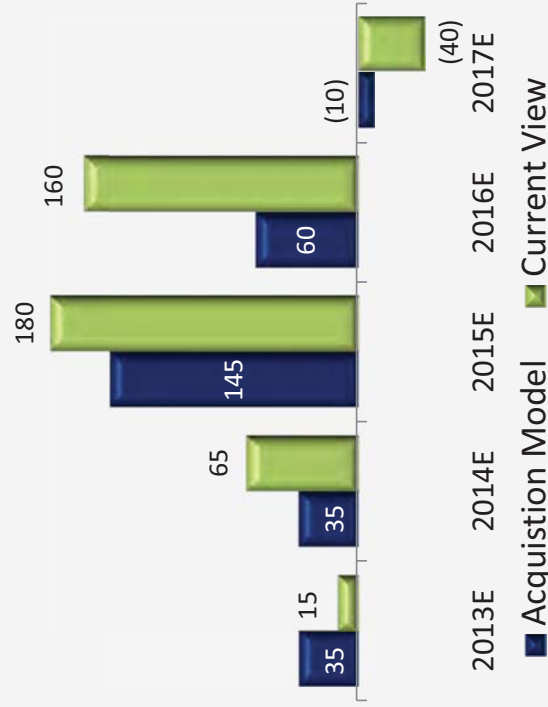
- **Logistics Projects**

- Link logistics assets
- Reduce third party fees
- Provides feedstock and product optionality

- **Processing Projects**

- Strengthen conversion capability
- Provides feedstock flexibility
- Improves product yields

**Net Capital**  
\$ millions



**Disciplined delivery of high return capital investments**

Note: Net synergy capital of ~\$375 MM (including savings beyond 2017, which are reflected in 2017E), capital plan net of capital avoidance, 2017 emissions estimate is subject to final project scope and detailed engineering.

## Keys to Distinction on the West Coast



**TESORO**

- Operating cost advantage
- Flexible yield structure
- Access to cost-advantaged crude oil
- Integrated logistics infrastructure
- Secure and ratable refinery off-take
- Cost-advantaged regulatory compliance



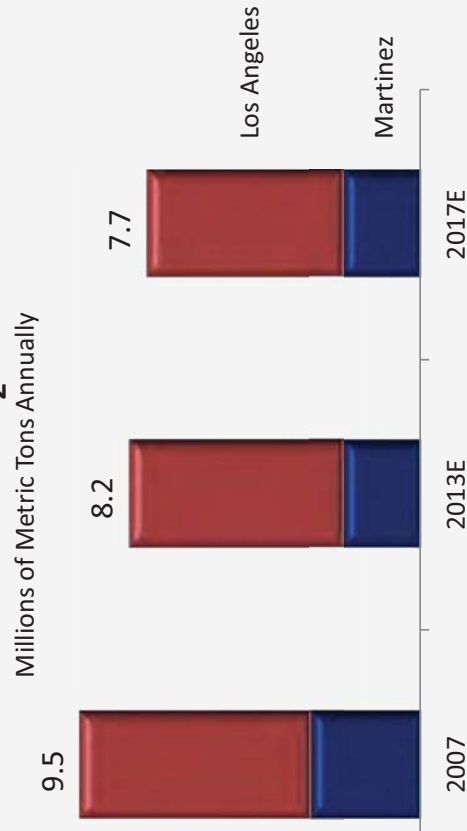
**Los Angeles acquisition transforms our capabilities**

# California Regulatory Environment



- Stationary source emissions
  - Low cost impact
- Fuels under the cap
  - Cost passed to consumers
- Low Carbon Fuel Standard
  - Blending requirements expected to moderate
- Potential refinery safety regulations

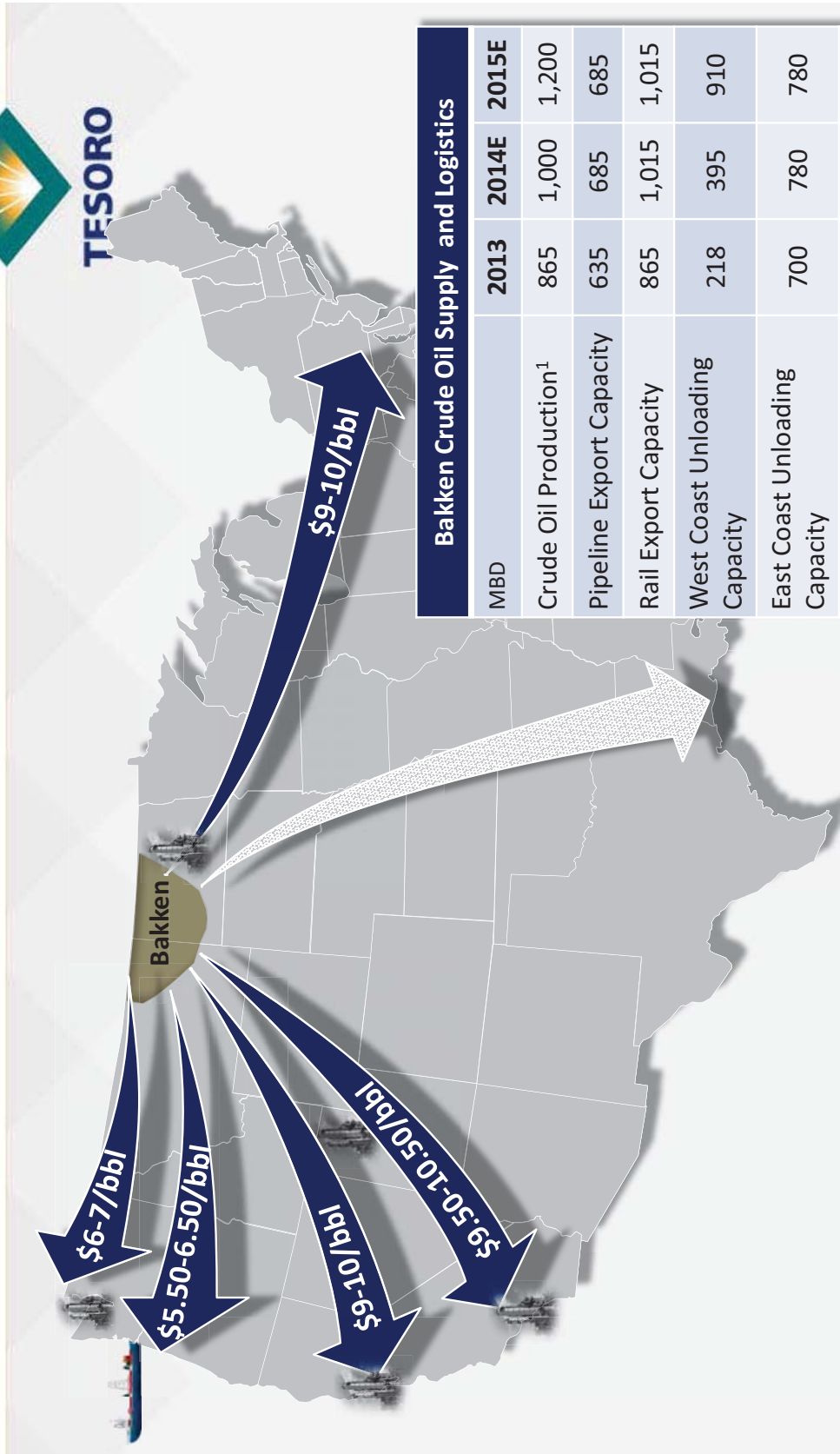
**Tesoro California CO<sub>2</sub> Emissions**



**Challenging but manageable operating environment**

Note: 2017 emissions estimate is subject to final project scope and detailed engineering, Los Angeles includes both Wilmington and Carson.

# Rail Costs to Clear Bakken



Bakken Crude Oil Supply and Logistics				
MBD	2013	2014E	2015E	
Crude Oil Production <sup>1</sup>	865	1,000	1,200	
Pipeline Export Capacity	635	685	685	
Rail Export Capacity	865	1,015	1,015	
West Coast Unloading Capacity	218	395	910	
East Coast Unloading Capacity	700	780	780	

## West and East Coasts clearing destinations for Bakken crude oil

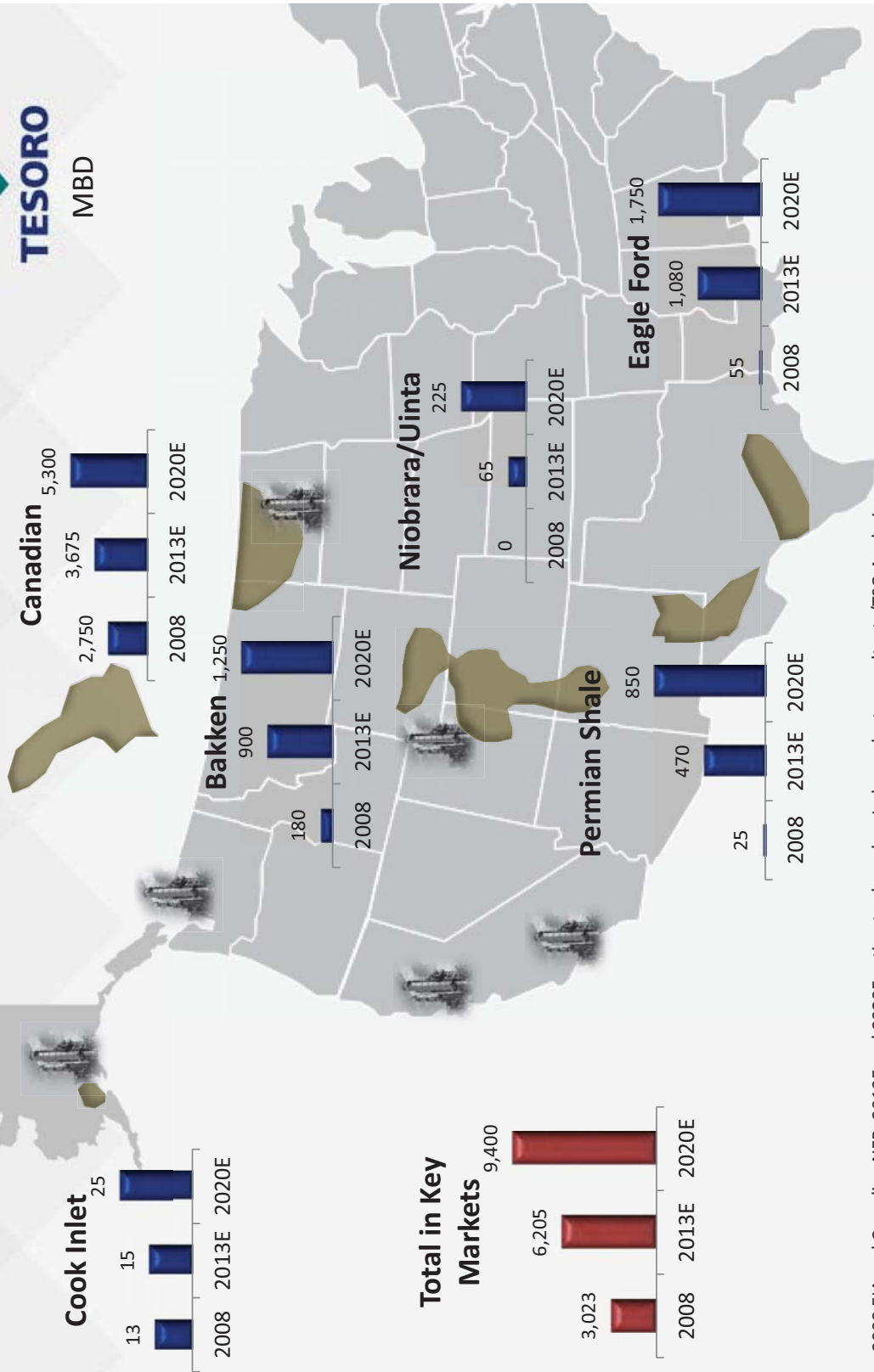
Note: Rail cost estimates include only the railroad tariff.

1) Average annual crude oil production, export capacity and price discount estimates based on industry consultant and Tesoro market outlook.

# Crude Oil Production Growth



## Key Tesoro Markets



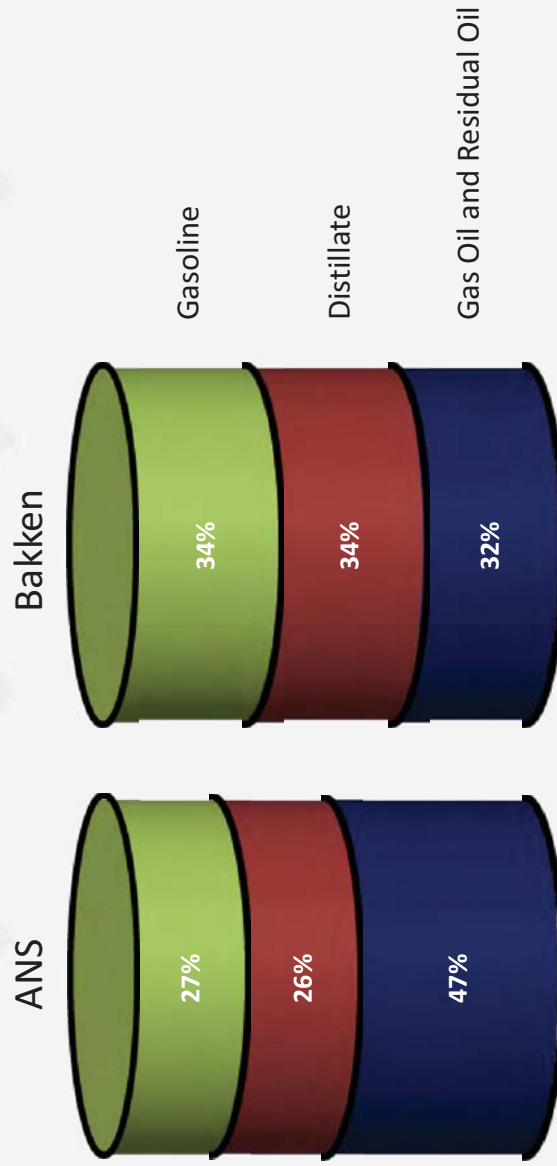
Source: 2008 EIA and Canadian NEB, 2013E and 2020E estimates based on Independent consultants/TSO Analysis.

# Anacortes Yield Comparison



TESORO

## Crude Oil Yields



**Bakken crude oil yields 14% to 16% more gasoline and distillate than ANS**

# Tesoro's Advantaged Feedstock Opportunity



## Opportunities by Refinery

- **Kenai**
  - Currently up to 25% Cook Inlet
  - Potentially up to 67% Cook Inlet and Bakken
- **Martinez**
  - Currently up to 45% California Heavy and Bakken
  - Potentially up to 67% California Heavy and Bakken
- **Los Angeles**
  - Currently up to 15% California Heavy
  - Potentially up to 50% California Heavy and Bakken



## Potential impact on ANS crude oil

- Competitive pricing
- Relative refining value

**Extending the advantaged crude oil to West Coast**

# Port of Vancouver

- Up to 300 MBD Rail-to-Marine Terminal
  - Joint venture with Savage Companies
- Port of Vancouver advantages
  - Flexibility to deliver to all West Coast refineries
  - Competitive with direct rail cost to California
  - Existing rail and marine infrastructure
- Port of Vancouver granted lease 3Q13



**TESORO**



	Completed Facility
Capacity	Up to 300 MBD
Estimated Completion	4Q14 – 4Q15
Tesoro Initial Committed Capacity	60 MBD

**A premier advantaged crude oil facility for the West Coast**

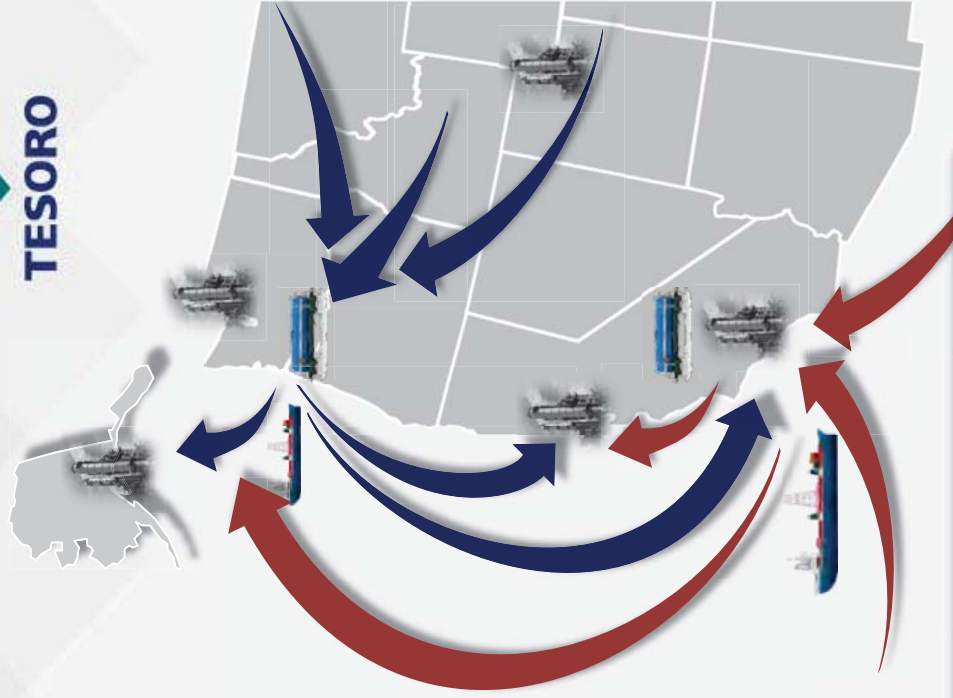


## West Coast Transportation Advantages



**Tesoro enjoys advantaged waterborne logistics capabilities**

- Access to domestic and foreign cost advantaged crude oil
- Feedstock optimization across 720 MBD of PADD V refining capacity
- Flexibility to source and leverage advantage feedstocks regardless of origin



**Capturing advantaged crude oil supply on West Coast**

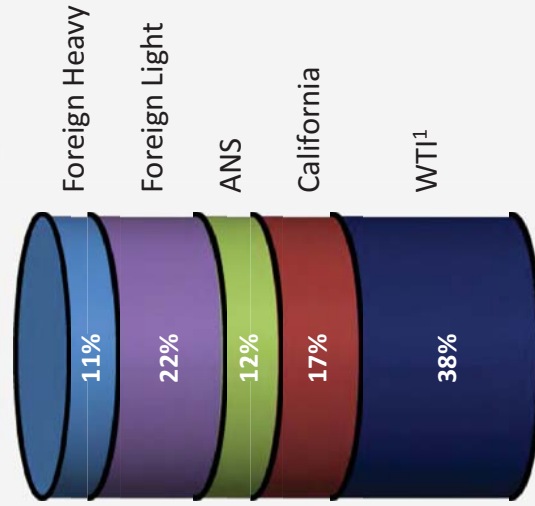
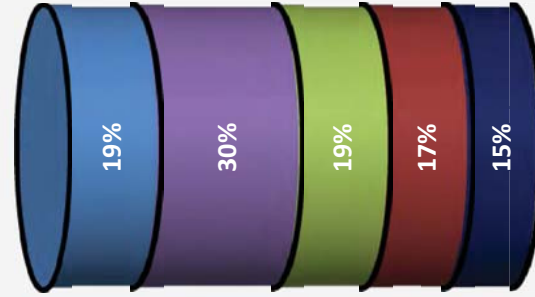
# West Coast Refining System Opportunity



Tesoro Consolidated West Coast Index



Tesoro Crude Oil Throughput



3Q 2013

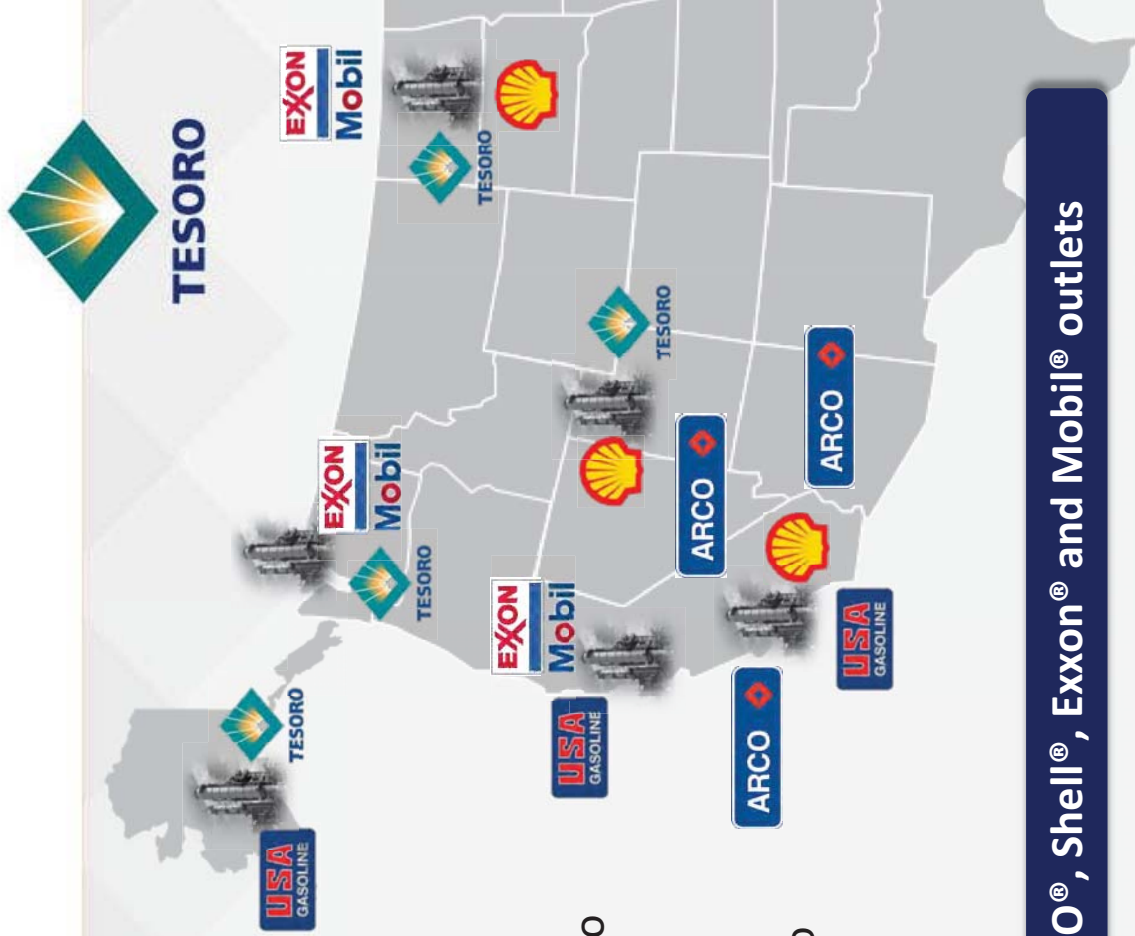
YE 2015E

**Advantage crude oil strategy enhances realized margins**

1) WTI crude oil includes all grades of N. American crude oil other than those stated in other categories.

# Marketing Brands

- Deploy a premium and value branding strategy within each region
- New brands allow for site optimization and conversion
- Leverage Shell®, Exxon® and Mobil® premium brand value to improve marketing channels
- Leverage ARCO®, Tesoro and USA value brand proposition to drive high utilization



**Emphasis on growing ARCO®, Shell®, Exxon® and Mobil® outlets**

# Solomon Based Cost Reductions



Total Operating Expense Gap (Non-energy)<sup>1</sup>

\$/bbl	2010	2011	2012
California	1.70	1.10	0.85
Pacific Northwest	NA	0.05	0.30
Mid-Continent	0.30	0.15	1.10
<b>Weighted Average</b>	<b>1.15</b>	<b>0.55</b>	<b>0.75</b>

- Captured cost improvements in California, opportunities remain
- Mid-Continent performance reflects increased spending to strengthen long-term reliability
- Maintenance, personnel efficiency and improved reliability driving per barrel operating cost improvement

**Targeting first tercile cost position in California**

1) Versus Solomon Refinery Supply Corridor (RSC) 1<sup>st</sup> tercile, Pacific Northwest adjusted in 2010 and 2011 to exclude the impact of the Anacortes incident.

# Tesororo Logistics LP



	Key Metrics
Enterprise Value (\$ billions)	3.6
Market Cap (\$ billions)	2.8
Crude Oil and Refined Product Pipelines	1,570 miles
High Plains Pipeline Throughput	90+ MBD
High Plains Trucking Volume	45 MBD
Marketing Terminal Capacity	565 MBD
Marine Terminal Capacity	845 MBD
Rail Terminal Capacity	50 MBD
Dedicated Storage Capacity	7,700 MBBLs

**TLLP growing rapidly into a premier Western US logistics provider**

# TLLP Organic Growth Opportunities



TESORO

## Bakken Crude Oil Gathering

- Expand High Plains System interconnection points
- Aggregate volumes for Port of Vancouver
- Develop major Bakken storage hub
- Expand pipeline gathering network

## Terminalling, Transportation and Storage

- Consolidate Tesoro volumes on Southern California distribution system
- Open Southern California terminals to third-party business
- Support capture of Southern California logistics synergies
- Expand terminals and add biofuel blending capabilities

**Significant opportunities to further grow the base business**

# TLLP Future Logistics Opportunities



## Tesoro Legacy Assets

- Kenai Marine Logistics
- Kenai Pipeline & Products System
- Anacortes Marine and Products Terminals
- Martinez Marine Products Terminal
- Martinez Products Terminal



## Assets Under Development

- Port of Vancouver Rail to Marine Terminal
- Alaska Cook Inlet Crude Oil Pipeline
- Uinta Crude Oil Pipeline
- Southern California Logistics

**Tesoro could realize in excess of \$1.5 billion in cash from future TLLP asset sales**

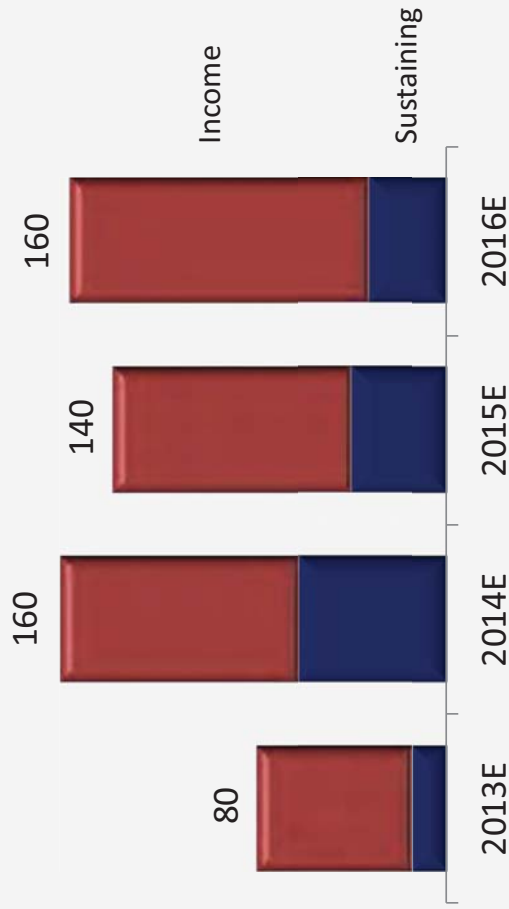
# TLLP Capital Spending



- TLLP plans to spend about \$100 million per year on income projects
- Typical project return of 15-25%
- Pursuing opportunities to expand gathering system
- TLLP self funds capital

Tesoro Logistics Capital Spend

\$ millions



**Income capital expected to support significant organic growth**

Note: Maintenance and regulatory capital before reimbursements. All references to capital spending on this page are estimated.

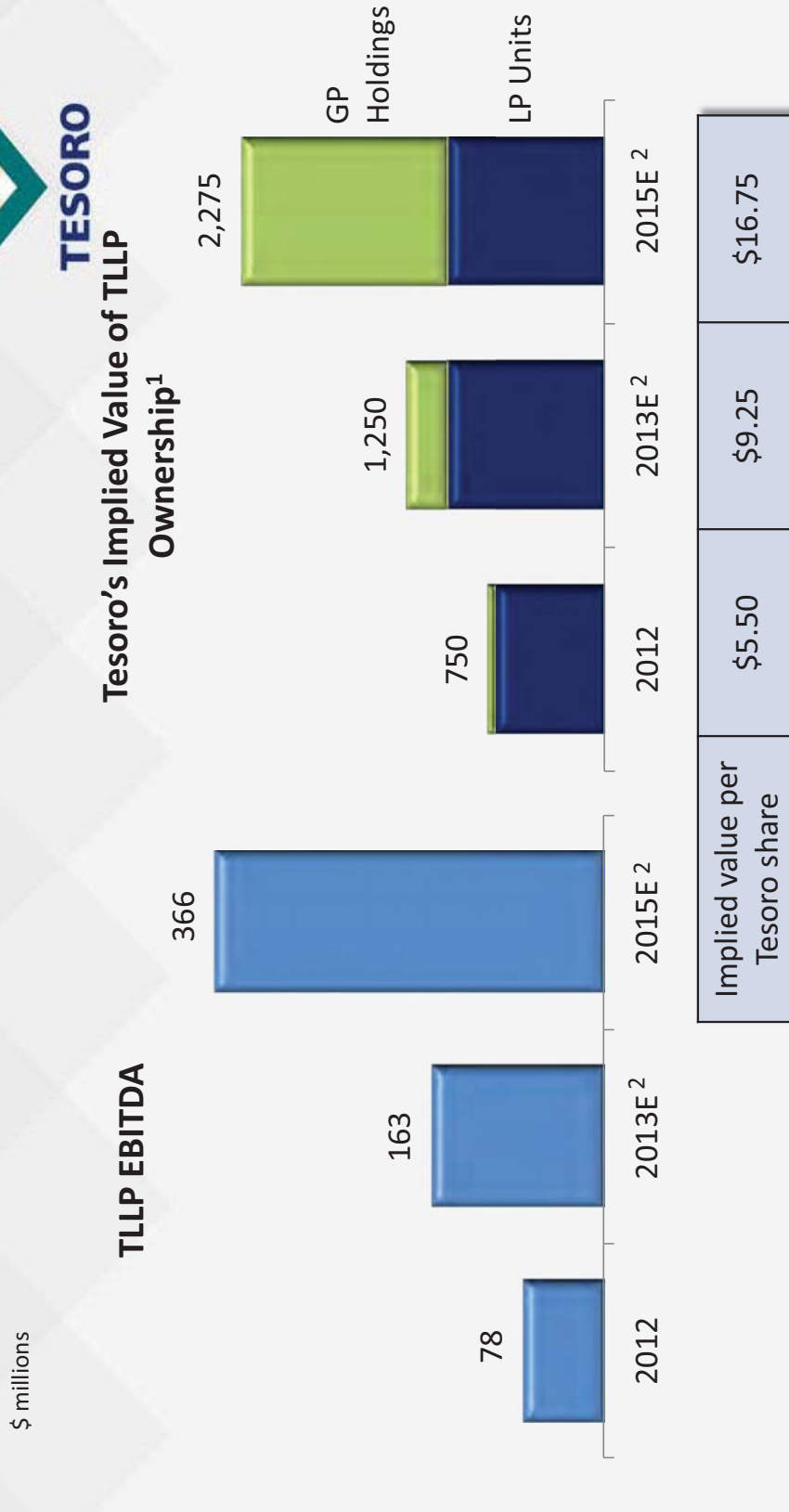


# TLLP Value Proposition to Tesoro



**TESORO**

Tesoro's Implied Value of TLLP Ownership<sup>1</sup>



**TLLP's growth drives significant Tesoro shareholder value creation**

1) TSO Market Cap as of 11/19/13, LP value based on market price, GP value based on 20X distributions.

2) Estimates based on TLLP first call consensus EBITDA figures as of 12/3/13.

# Financial Priorities



**TESORO**

- Maintain a minimum cash balance of \$600 to \$800 million

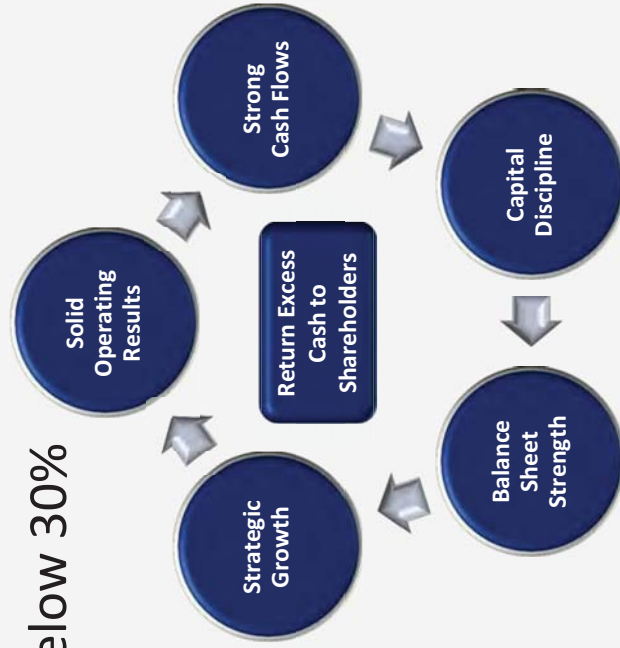
- Target TSO debt to capitalization<sup>1</sup> below 30%

- Target TLLP debt at 3x to 4x EBITDA

- Invest in growth opportunities to drive further value creation

- Return excess cash to shareholders

- Drive towards investment-grade credit rating



1) Excluding TLLP debt and equity.

# Los Angeles Acquisition Summary



Los Angeles Acquisition Summary	\$ billions
Property, Plant and Equipment	1.0
Logistics Asset Sales to TLLP	(1.3)
<b>Net Investment in R&amp;M Assets</b>	<b>(0.3)</b>
Working Capital	1.3
Working Capital Reductions	(0.2)
<b>Net Working Capital</b>	<b>1.1</b>
<b>Net R&amp;M Investment</b>	<b>0.8</b>

Low investment delivers significant cash-on-cash returns

# Appropriate Leverage for Growth



**TESORO**

<i>\$ millions</i>	TSO <sup>1</sup>	TLLP <sup>2</sup>	Consolidated
Total Debt	1,666	1,159	2,825
Total Equity	4,415	1,185 <sup>4</sup>	5,600
Debt to Total Capitalization	<b>27%</b>	49%	34%
Total Debt to EBITDA <sup>3</sup>	0.8x	<b>3.9x</b>	1.4x

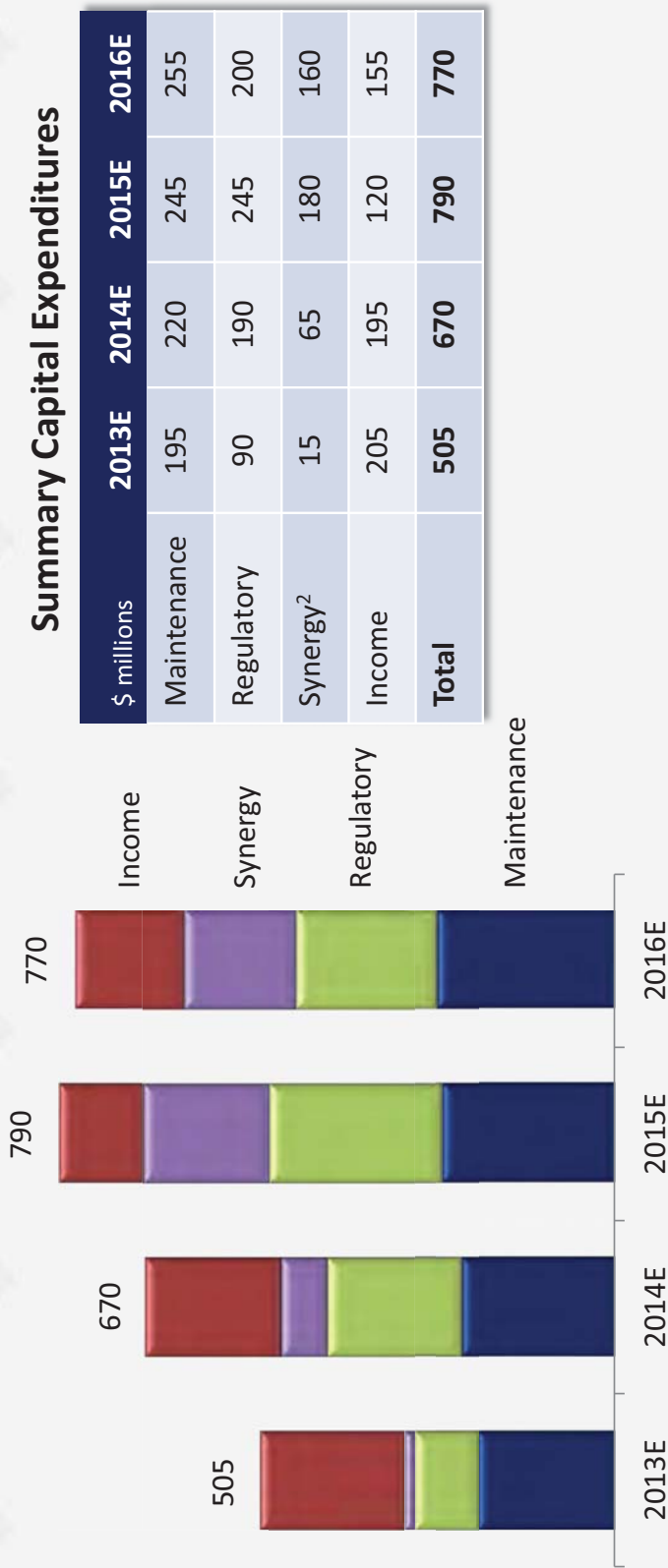
**Tesoro leverage in target range less than 7 months after Los Angeles acquisition**

- 1) As of September 30, 2013 pro forma for an additional \$800 million of subsequent debt reduction. Excludes TLLP debt and non-controlling interest.
- 2) As of September 30, 2013 pro forma for the second purchase of Los Angeles logistics assets for \$650 million including \$250 million of new debt.
- 3) EBITDA forecast based on latest 2014 consensus analyst research estimates.
- 4) Represents non-controlling interest as of 9/30/13 adjusted for November 2013 equity offering.

# Summary Capital Spending



Tesoro Capital Spending<sup>1</sup>  
\$ in millions



**Capital spending plans well supported by strong and growing EBITDA**

1) Excludes self-funded TLLP capital expenditures. All references to capital spending on this page are estimated.  
 2) Net synergy capital.

# Delivering Free Cash Flow

- Expect to generate approximately \$3.0 billion in free cash flow over next three years
- Before potential \$1.5 billion of further logistics asset sales to TLLP
- Plan to spend less than a third on high-return income capital projects
- Tesoro well positioned for further growth and returning cash to shareholders



**TESORO**

**Free Cash Flow<sup>1</sup>**

\$ in billions



**Strong financial position and significant free cash flow in 2014 and beyond**

(1) Defined as EBITDA less cash interest and taxes, sustaining capital, turnaround spending and TLLP distributions. EBITDA estimates based on consensus analyst research estimates as of November 19, 2013 and incremental improvements in this presentation above base Los Angeles synergies announced at time of acquisition. Interest, taxes, sustaining capital, turnaround spending and TLLP distributions based on Tesoro's 2014 Business Plan.

# Delivering Shareholder Value



## Los Angeles Refinery Integration Project



- Largest California synergy capital project
- Project includes<sup>1</sup>
  - Improved gasoline/distillate yield flexibility
  - Decommissions Wilmington fluid catalytic cracking unit
  - Reduces CO2 emissions
  - Final scope expected 2Q14
  - Project completion expected early 2017
- Estimated net CAPEX of \$140 to 160 million
- Estimated EBITDA of \$50 to 75 million
- Estimated IRR over 30%



**Significantly improves Los Angeles refinery competitive position**

1) Based on original acquisition plans, subject to final project scope and detailed engineering.



# Salt Lake City Conversion Project



- Phase 1
  - Expanded waxy crude capacity
  - Completed 2Q 2013
  - Total cost of \$175 million
- Phase 2
  - Additional expansion of waxy crude capacity up to 22 MBD
  - Increases throughput capacity by 4 MBD
  - Enhances clean product yields
  - Estimated completion early 2015
  - Total cost of \$100 million
- Total project annual EBITDA<sup>1</sup> contribution \$100 million
- Approximately 30% IRR

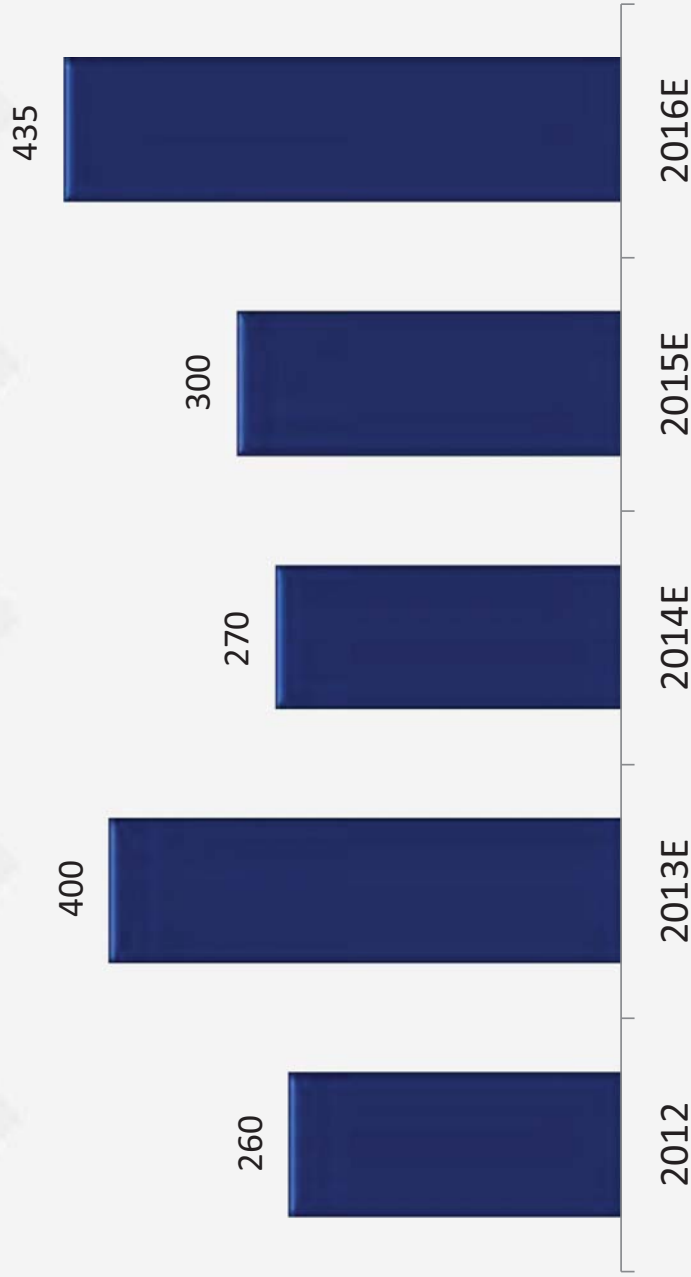


1) EBITDA estimate consistent with Tesoro market outlook.

# Turnaround Spending



Tesoro Turnaround Spending  
\$ in millions



**Lower turnaround spending in 2014 and 2015**

Note: 2014 to 2016 includes deferred rebranding costs of \$50, \$40 and \$40 million respectively.

# Non-GAAP Financial Measures



**TESORO**

EBITDA represents earnings before interest and financing costs, net, interest income, income taxes, and depreciation and amortization expense. We present EBITDA because we believe some investors and analysts use EBITDA to help analyze our cash flows including our ability to satisfy principal and interest obligations with respect to our indebtedness and to use cash for other purposes, including capital expenditures. EBITDA is also used by some investors and analysts to analyze and compare companies on the basis of operating performance and by management for internal analysis. EBITDA should not be considered as an alternative to net earnings, earnings before income taxes, cash flows from operating activities or any other measure of financial performance presented in accordance with accounting principles generally accepted in the United States of America. EBITDA may not be comparable to similarly titled measures used by other entities.

*(In millions) Unaudited*

	California Synergy EBITDA - Acquisition Model				
	2013E	2014E	2015E	2016E	2017E
<b>Projected net earnings</b>	\$ 18	\$ 67	\$ 104	\$ 133	\$ 149
Add income tax expense	11	41	63	82	91
Add depreciation and amortization expense	1	2	8	10	10
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 30</b>	<b>\$ 110</b>	<b>\$ 175</b>	<b>\$ 225</b>	<b>\$ 250</b>

*(In millions) Unaudited*

	California Synergy EBITDA - Current View				
	2013E	2014E	2015E	2016E	2017E
<b>Projected net earnings</b>	\$ 23	\$ 127	\$ 193	\$ 239	\$ 280
Add income tax expense	14	75	113	141	165
Add depreciation and amortization expense	0	3	9	15	15
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 37</b>	<b>\$ 205</b>	<b>\$ 315</b>	<b>\$ 395</b>	<b>\$ 460</b>

*(In millions) Unaudited*

	Gross Margin Capture Improvements EBITDA	
	2014E	2015E
<b>Projected net earnings</b>	\$ 88	\$ 163
Add income tax expense	51	96
Add depreciation and amortization expense	11	11
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 150</b>	<b>\$ 270</b>

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.

# Non-GAPP Financial Measures



*(In millions) Unaudited*

	Improve the Base EBITDA	
	2014E	2015E
Projected net earnings	\$ 50	\$ 63
Add income tax expense	30	37
Add depreciation and amortization expense	0	0
<b>EBITDA <sup>(1)</sup></b>	<b>\$ 80</b>	<b>\$ 100</b>

*(In millions) Unaudited*

	TLLP EBITDA <sup>(2)</sup>		
	2012	2013E	2015E
Projected net earnings	\$ 56	\$ 83	\$ 215
Add interest and financing costs, net	9	43	75
Add depreciation and amortization expense	13	37	76
<b>EBITDA</b>	<b>\$ 78</b>	<b>\$ 163</b>	<b>\$ 366</b>

*(In billions) Unaudited*

	Free Cash Flow Reconciliation		
	2014E	2015E	2016E
Net Cash Flow from Operating Activities	\$ 1.5	\$ 1.5	\$ 1.8
Less Sustaining Capital	0.4	0.5	0.5
Less TLLP Distributions	0.1	0.1	0.2
<b>Free Cash Flow</b>	<b>\$ 1.0</b>	<b>\$ 0.9</b>	<b>\$ 1.1</b>

*(In millions) Unaudited*

	Annual EBITDA Estimate	
	Salt Lake City Waxy	LA Refinery Integration
Projected net earnings	\$ 57	\$ 33
Add income tax expense	33	19
Add depreciation and amortization expense	10	10
<b>EBITDA</b>	<b>\$ 100</b>	<b>\$ 62</b>

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.

(2) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation.