

**JTC)**

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**From:** ann\_murphy@juno.com  
**Sent:** Wednesday, December 18, 2013 4:18 PM  
**To:** EFSEC (UTC)  
**Subject:** Scoping Comments for Tesoro Savage Vancouver Energy Distribution Terminal

RE: EFSEC SEPA Scoping / Proposed Tesoro Savage Vancouver Energy Distribution Terminal

The League of Women Voters of the Spokane Area (LWVSA) offers the following regarding the construction of the proposed Tesoro Savage Distribution Terminal at Vancouver, Washington, and transportation of oil through Spokane and eastern Washington to the proposed new facility.

LWVSA has positions supporting

- **Maximum protection to the Spokane Valley-Rathdrum Prairie Aquifer:** This sole source of drinking water is directly underneath the rail lines that are intended to carry the oil from North Dakota to Vancouver. The Aquifer intermingles with the Spokane River at multiple points through the Spokane Valley – with water from the river going into the aquifer water.
- **Maintenance of clean air quality in the Spokane area:** In reality, the local topography and air flow can result in temperature inversions over the populated area Spokane, thus trapping particulates. Poor air quality has an adverse effect on human health.
- **A balanced transportation policy:** While rail traffic is an important part of Spokane's commerce, there are multiple other forms of transportation in the Spokane area – and all need to be balanced. Additionally, many parts of the Spokane Valley do not have over/under passes—crossings are at grade. Additional train traffic will seriously impact transportation throughout the region.

The League of Women Voters of the Spokane Area believes that the Environmental Impact Statement should be cumulative and address the impacts all along the rail route, and not just on the port terminal area. Scoping also needs to address the cumulative effect of impacts over time. These additional trains would be coming through Spokane as a result of the completion of the proposed port. Spokane will be a choke point for rail traffic with trains continuing to western Washington as well as Oregon. The League would like you to study:

- Effects to the Spokane Valley-Rathdrum Prairie Aquifer and Spokane River from fugitive pollutants as well as potential rail car derailments that could deposit oil on the ground and into the river. Additionally, the study should examine the effect of oil deposits on land by the rail tracks that could find its way to the Spokane River through run-off. We understand that the some of the tanker cars are substandard— so, how much oil could escape?
- The effects of diesel particulates from the additional trains on the air quality in the Spokane area (particularly given the air inversions that we experience).
- The effect of superior upgrades on the cars and/or other methods of transport – ie., a pipeline.
- The effect of the additional rail traffic on the balance of transportation in and through Spokane. In Spokane, the effects on emergency response times and general traffic flow at railroad crossings need to be studied. In addition to compromised emergency response, there needs to be an examination of the affect on air quality when the waiting traffic is idling while waiting at a crossing. For transportation through Spokane, the rail capacity needs to be examined – will there be capacity for other freight and human rail transport?
- The impact of adding this train traffic to the already proposed coal train traffic needs to be considered.

Above all, the League supports the continued transparency in the process, and encourages continued citizen participation at all steps of the way.

Ann Murphy, President  
League of Women Voters/Spokane Area

**From:** Sierra Club <information@sierraclub.org> on behalf of Rita Vandenburg  
<rsvanden@comcast.net>  
**Sent:** Wednesday, December 18, 2013 4:21 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

The public safety and environmental impacts of this proposal deserve close scrutiny. For example, EFSEC must assess:

1) The potential safety and environmental impacts of a large train-related oil spill or explosion along the rail route in Washington and beyond. Recent derailment disasters in Lac-Mégantic, Quebec and Alabama have shown that these risks are far too real. The tragedy in Quebec, in particular, highlighted the extreme danger of the same type of oil and tankers that would be traveling through our communities. Forty-seven people died in that explosion, which also devastated the town.

2) The increased risk of an oil tanker spill on Washington State waters and along the shipping route.

3) The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route.

This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.

4) The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave.

5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mrs. Rita Vandenburg  
636 D St  
Springfield, OR 97477-4636



(UTC)

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**From:** Sierra Club <information@sierraclub.org> on behalf of Kathi Reed  
<kchell.maui@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 4:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Kathi Reed  
1430 Willamette St Apt 524  
Eugene, OR 97401-4049  
(541) 338-3002

**UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Jim Cronin <jjcro2112@hotmail.com>  
**Sent:** Wednesday, December 18, 2013 4:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mr. Jim Cronin  
PO Box 9544  
Spokane, WA 99209-9544  
(509) 299-7794

**JTC)**

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**From:** Solveig Nilsen-Goodin <solveigng@gmail.com>  
**Sent:** Wednesday, December 18, 2013 4:39 PM  
**To:** EFSEC (UTC)  
**Subject:** Tesoro Savage Terminal comment

December 18, 2013

Dear Governor Inslee and Washington EFSEC:

As an ordained pastor, I am deeply concerned about the TesoroSavage Oil Terminal because of its implications from beginning to end: from the environmental and health impacts of extracting the oil, to the extraordinary range of potential negative impacts and significant risks of its transportation via rail, to the truly devastating impacts on global climate change from the carbon dioxide produced by its burning – wherever it is burned. Every one of these impacts – actual or potential – has profound spiritual and moral implications about which I am deeply troubled.

As a mother of two sons, ages 8 and 5, I am even more deeply troubled by the impact of this oil terminal on the quality of my children's lives, and also on the quality – even the possibility – of life for my children's children and for generations to come.

As I understand it, the question you are seeking to answer is how broad a scope of environmental impact should be considered when deciding whether or not to approve this terminal. For me, the answer is obvious: every single actual or potential negative impact from the extraction of the oil to its burning must be considered. Absolutely nothing should be excluded from study when making this decision.

Why? As I said, my sons are ages 8 and 5. Right now, they are still just beginning to understand that their actions have consequences, that the decisions they make have implications for good or for ill. Because they are still children, they do not have the developmental capacity to take into account the wide array of implications of their actions. Through the process of action and reflection, they will develop that capacity and thereby ultimately assume their responsibility as adults – adults who DO have the capacity to take into account the vast implications of their actions, and to make decisions out of that capacity.

We are no longer children. We have a sacred responsibility as adults to study every single possible negative impact of this terminal, from extraction to burning, and from now to centuries into the future. The failure to do so is an abdication of that sacred responsibility. And given what we know about climate change alone, the

failure to do so – willfully choosing to not take into account some of the possible negative impacts of this decision – is unconscionable. I call on you to take up your sacred responsibility. Thank you.

With trust and hope,

Rev. Solveig Nilsen-Goodin

6206 NE Broadway

Portland, OR 97213

**UTC)**

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**From:** Friends of the Columbia Gorge <Advocacy@GorgeFriends.org> on behalf of Deborah Romerein <dromerein@gmail.com>  
**Sent:** Wednesday, December 18, 2013 4:42 PM  
**To:** EFSEC (UTC)  
**Subject:** Docket No. EF-131590 Application No. 2013-01 Tesoro Savage Vancouver Energy Distribution Terminal Comments

Dec 18, 2013

Energy Facility Site Evaluation Council  
WA

Dear Site Evaluation Council,

Please deny the permit for the Tesoro Savage Vancouver Energy Distribution Terminal.

The proposed Tesoro Savage project would transport 360,000 barrels of oil per day through the Columbia River Gorge National Scenic Area. I have grave concerns about this proposal and its impact on the Columbia River Gorge National Scenic Area. The scope of review under the State Environmental Policy Act (SEPA) must include the following:

What is the purpose of the project? The purpose statement must not be narrowly worded to only include the construction of an oil terminal for distribution of oil through the region. The purpose should be broad enough to include providing for the energy needs of the region and providing opportunities for appropriate waterfront development in Vancouver that benefits the local community.

Is there a need for this project? There is not. This proposal, in conjunction with other existing and pending oil terminals, would result in a glut of oil in the Northwest that would far exceed current consumption. There are alternative waterfront development opportunities that would create jobs and generate greater benefits for the local community.

What are the alternatives? A "no action" alternative; an alternative relying on other oil terminals that already exist, are in the permitting process or under construction; and reducing reliance on fossil fuels all must be considered as viable alternatives. Transport routes that do not pass through congressionally protected areas, like the Columbia River Gorge also must be included in the alternatives analyses. The EIS should also consider reasonably foreseeable waterfront development opportunities that would be incompatible with an oil terminal, such as mixed use development with waterfront amenities.

What are the direct, indirect and cumulative effects of the proposal, including transportation impacts on the Columbia River Gorge National Scenic Area, such as:

- Increased air pollution from train diesel emission. The Gorge already suffered from smog and visibility impairment up to 95% of the time.

- Rail expansion into sensitive areas. Rail lines in the Gorge are currently near capacity. This proposal and other oil by rail and coal export proposals would result in rail infrastructure expansion into sensitive areas in the Gorge, including wetlands, fish and wildlife habitat, rare plant habitat, and cultural resource sites. These likely impacts must be included in the scope of review.

- Likelihood of accidents. Current coal train traffic in the Gorge has resulted in massive amounts of coal dust escaping the open topped rail cars, which weakens the train ballast and causes accidents. The U.S. Surface Transportation Board has determined that coal dust is a "pernicious ballast foulant," weakening rail lines and resulting in derailments. The likelihood of oil train derailments, the likely effects on the Columbia River Gorge and the impacts on communities must be analyzed.

- Adverse effects to resources protected by the Columbia River Gorge National Scenic Area Act. The project's indirect and cumulative effects on the scenic, natural, cultural and recreation resources of the Columbia River Gorge National Scenic Area must be included in the scope of review.

In conclusion, SEPA requires that the EIS address impacts to sensitive or special areas, such as the Columbia River Gorge, and the degree that the proposal would conflict with state, local, and federal protections for the environment, such as the Columbia River Gorge National Scenic Area Act. WAC 197-11-330(3)(e)(i), (iii). State law also requires the Governor and all state agencies to carry out their respective functions in accordance with the Columbia River Gorge National Scenic Area Act.

RCW 43.97.025. EFSEC and the Governor are required to review projects for their impacts on the Columbia River Gorge and to take actions to avoid those impacts.

Thank you for considering these comments and including them into the official record.

Sincerely,

Ms. Deborah Romerein  
3512 NE 23rd Ave  
Portland, OR 97212-1400  
(503) 887-8302



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**From:** Sierra Club <information@sierraclub.org> on behalf of Ariel Israea  
<jala.reflection@gmail.com>  
**Sent:** Wednesday, December 18, 2013 4:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Ariel Israea  
3200 Siskiyou Blvd  
Ashland, OR 97520-9575

**(UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of David & Nora Weisenhorn <noraw@weisenhorn.net>  
**Sent:** Wednesday, December 18, 2013 4:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mr. David & Nora Weisenhorn  
5710 N Star Rd  
Ferndale, WA 98248-9614  
(360) 384-0974

**From:** Sierra Club <information@sierraclub.org> on behalf of Ashlee Sprugel <a1302grand@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 5:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Ashlee Sprugel  
1302 Grand Blvd  
Vancouver, WA 98661-4730  
(360) 910-0739

**From:** Sierra Club <information@sierraclub.org> on behalf of Mona Linstromberg <lindym@peak.org>  
**Sent:** Wednesday, December 18, 2013 6:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

Still hearing about Quebec. The people there will live it forever:

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Mona Linstromberg  
831 E Buck Creek Rd  
Tidewater, OR 97390-9629



**(UTC)**

---

**From:** Sierra Club <information@sierraclub.org> on behalf of Emma Rollins <emma.g.rollins@gmail.com>  
**Sent:** Wednesday, December 18, 2013 6:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Miss Emma Rollins  
2509 SE Yamhill St  
Portland, OR 97214-2852

Tesoro Savage CBR  
Scoping Comment  
#30712

**UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Nancy L. and Bert A. Anderson <nancya@bisp.net>  
**Sent:** Wednesday, December 18, 2013 6:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mrs. Nancy L. and Bert A. Anderson  
612 Chestnut St  
Ashland, OR 97520-1549  
(541) 552-1063

Tesoro Savage CBR  
Scoping Comment  
#30713

**ITC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Paula Sutherland <psvoyagers@gmail.com>  
**Sent:** Wednesday, December 18, 2013 6:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

The public safety and environmental impacts of this proposal deserve close scrutiny. For example, EFSEC must assess:

1) The potential safety and environmental impacts of a large train-related oil spill or explosion along the rail route in Washington and beyond. Recent derailment disasters in Lac-Mégantic, Quebec and Alabama have shown that these risks are far too real. The tragedy in Quebec, in particular, highlighted the extreme danger of the same type of oil and tankers that would be traveling through our communities. Forty-seven people died in that explosion, which also devastated the town.

2) The increased risk of an oil tanker spill on Washington State waters and along the shipping route.

3) The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.

4) The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave.

5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mrs. Paula Sutherlin  
352 Suther Ln  
Elk, WA 99009-8741

**From:** Sierra Club <information@sierraclub.org> on behalf of James McConville <ojim@mind.net>  
**Sent:** Wednesday, December 18, 2013 7:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mr. James McConville  
5197 Pioneer Rd  
Medford, OR 97501-9316  
(541) 734-8506



Docket EF-131590

Tesoro Savage CBR  
Scoping Comment  
#30715

**(UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Jacalyn Johnson <jackiejjj@hotmail.com>  
**Sent:** Wednesday, December 18, 2013 7:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

The public safety and environmental impacts of this proposal deserve close scrutiny. For example, EFSEC must assess:

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- 2) The increased risk of an oil tanker spill on Washington State waters and along the shipping route.
- 3) The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.
- 4) The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave.
- 5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Jacalyn Johnson  
PO Box 41302  
Eugene, OR 97404-0329

UTC)

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**From:** Sierra Club <information@sierraclub.org> on behalf of Marta Glenn Lmp  
<martaglenn63@gmail.com>  
**Sent:** Wednesday, December 18, 2013 8:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

The public safety and environmental impacts of this proposal deserve close scrutiny. For example, EFSEC must assess:

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Forty-seven people died in that explosion, which also devastated the town.

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Marta Glenn Lmp  
232 143rd Ave SE  
Tenino, WA 98589-9604

**UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Barbara O'Steen <barbarajosteen@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 8:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

The public safety and environmental impacts of this proposal deserve close scrutiny. For example, EFSEC must assess:

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Barbara O'Steen  
4364 SW Cloverdale St  
Seattle, WA 98136-2406

**UTC)**

---

**From:** Sierra Club <information@sierraclub.org> on behalf of Dawn Foss  
<lx\_foss@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 8:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Dawn Foss  
1650 27th Ave SW  
Albany, OR 97321-3411



**UTC)**

---

**From:** Sierra Club <information@sierraclub.org> on behalf of Barbara O'Steen <barbarajosteen@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 8:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

If approved, the plan would result in 380,000 barrels of oil each day being shipped through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to recommend the rejection of Tesoro-Savage's proposal.

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Barbara O'Steen  
4364 SW Cloverdale St  
Seattle, WA 98136-2406

**From:** Sierra Club <information@sierraclub.org> on behalf of Dawn Foss  
<lx\_foss@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 8:52 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 18, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Ms. Dawn Foss  
1650 27th Ave SW  
Albany, OR 97321-3411

**UTC)**

---

**From:** Sierra Club <information@sierraclub.org> on behalf of Rand Guthrie <r\_guth7@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 10:22 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 19, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mr. Rand Guthrie  
7102 77th Ave SE  
Snohomish, WA 98290-5815  
(360) 568-2665

**(UTC)**

---

**From:** Sierra Club <information@sierraclub.org> on behalf of Jacob Smith <jacobsmith82@gmail.com>  
**Sent:** Wednesday, December 18, 2013 11:53 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 19, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Mr. Jacob Smith  
1013 N Prospect St  
Tacoma, WA 98406-7809



Docket EF-131590

Tesoro Savage CBR  
Scoping Comment  
#30723

**(UTC)**

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**From:** Sierra Club <information@sierraclub.org> on behalf of Harrison Bertram <thedanzman@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 11:53 PM  
**To:** EFSEC (UTC)  
**Subject:** Comment on Docket No. EF-131590, Application No. 2013-01

Dec 19, 2013

Mr. Stephen Posner  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I'm writing regarding Docket No. EF-131590, Application No. 2013-01 to urge the Washington Energy Facility Site Evaluation Council (EFSEC) to assess the full environmental and public safety impact of the joint Tesoro-Savage proposal to turn the Port of Vancouver into a major crude oil export terminal.

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- 3) The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.
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- 5) The impact of the project's cradle-to-grave CO2 emissions on the viability of the large oyster industry in Washington State.

After carefully considering the safety, environmental, and climate risks associated with the proposed oil terminal, I respectfully ask you to recommend the rejection of Tesoro-Savage's application.

Sincerely,

Dr. Harrison Bertram  
1090 Groton Ct  
Schaumburg, IL 60193-3745

(UTC)

---

**From:** President, League of Women Voters of Washington <president@lwvwa.org>  
**Sent:** Wednesday, December 18, 2013 10:29 AM  
**To:** EFSEC (UTC)  
**Cc:** Raelene Gold; Pat Dickason  
**Subject:** Comments on Tesoro Savage Terminal from the League of Women Voters  
**Attachments:** Tesoro Savage Terminal Comments - LWVWA Dec 2013.pdf  
  
**Categories:** Red Category

Dear Mr. Posner,

Please find attached our comment letter on the proposed Tesoro Savage Terminal in Vancouver, WA.

Thank you for the opportunity to provide comments.

Sincerely,

Kim Abel, President  
360-874-6774

**League of Women Voters of Washington**  
1402 Third Avenue, Suite 430, Seattle, WA 98101  
[president@lwvwa.org](mailto:president@lwvwa.org) | 206-622-8961 | [www.lwvwa.org](http://www.lwvwa.org)  
Join [League](#) | Find us on [Facebook](#) | Subscribe to [E-News](#)



**LEAGUE OF WOMEN VOTERS OF WASHINGTON**

1402 Third Ave, Suite 430, Seattle, WA 98101

Tel: 206-622-8961 • 1-800-419-2596 • Fax: 206-622-4908 • Email: [info@lwvwa.org](mailto:info@lwvwa.org)

Website: [www.lwvwa.org](http://www.lwvwa.org)

---

December 18, 2013

*Stephen Posner  
Interim EFSEC Manager  
Energy Facility Site Evaluation Council  
PO Box 43172  
1300 S Evergreen Park Dr. SW  
Olympia, WA 98504-3172  
[efsec@utc.wa.gov](mailto:efsec@utc.wa.gov)*

Dear Mr. Posner,

The League of Women Voters of Washington (LWVWA) appreciates the opportunity to comment on the Tesoro Savage proposed oil terminal project at the Port of Vancouver, Washington. This project would result in the railcar transport of 360,000 barrels of crude oil per day through Spokane and the City of Vancouver and all the towns in between including the Columbia River Gorge Scenic Area. The crude oil will then be loaded onto oil vessels through the lower Columbia River and its estuary.

The LWVWA has an ongoing interest and positions regarding the Columbia River supporting comprehensive basin-wide coordinated planning, administration and conflict resolution. LWVWA supports policies to achieve water quality to maintain species populations and diversity, measures to protect estuaries, and the reduction of ambient and trans-boundary toxic air pollutants and the reduction of green house gas emissions.

The LWVWA believes that this project should not go forward. As the list below identifies, issues have not been reviewed closely enough to determine how this project and the many other oil and coal train transportation projects will affect treaty rights, health and safety of ecosystems and the economic viability of many towns, communities, the Columbia River Gorge National Scenic Area and the important transportation system of the lower Columbia River.

We urge you to make your decision considering the lack of full information of the impacts below:

- Impacts on human safety and infrastructure; air, soil and water pollution of an oil transporting railcar derailment, multicar collisions, oil spills, explosions or fire.
- Impacts of delays on local and intercity public transportation by oil transporting trains at train crossings and delays to Amtrak trains on the Spokane to Portland, OR route.
- Cumulative traffic impacts of this proposal and the many other energy transportation rail proposals along the same routes.

- Impacts to the National Columbia Gorge Scenic Area's air pollution and visibility by the diesel trains.
- Risks of collision from increased vessels traffic in the lower Columbia River.
- Risks of increased oil spills into the Columbia River from added oil bearing vessels associated with this project, and the adequacy of oil spill prevention measures in place, and evaluation of emergency oil spill response capabilities.
- Consequences from ongoing Columbia River Treaty negotiations and proposals to increase high and low Columbia River flows levels, which will affect vessel draft requirements and shoaling, impacting vessel safety.
- Impacts of oil spill pollution on seabirds and migrating shorebirds, and nesting terns on the islands in the river, as well as the ESA listed Marbled Murrelet.
- Impacts of oil spill pollution on protected marine mammals; ESA listed migrating salmon and shellfish, including cultivated oysters.
- Impacts on associated carbon emissions and how it will affect our state and regional goals for reductions in carbon emissions.

We urge you to consider these impacts as you formulate your recommendation to Governor Inslee regarding this project.

Sincerely,

*Kim E. Abel*

Kim Abel  
President

Raelene Gold  
Columbia River Chair

Tesoro Savage CBR  
Scoping Comment  
#30725

Docket EF-131590

UTC)

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**From:** Billie Jo Bray <billiejobray@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 9:58 AM  
**To:** EFSEC (UTC)  
**Subject:** Tesoro Savage Project Comment  
**Attachments:** tesororequestcomment.docx  
  
**Categories:** Red Category

Please accept attached comment.

Visions For Our Future  
| Address: P.O. Box 526,  
Keller, WA 99140 Phone: (509) 634-4225  
[billiejobray@yahoo.com](mailto:billiejobray@yahoo.com)

December 13, 2013

Stephen Posner, EFSEC Interim Manager  
Energy Facility Siting Evaluation Council  
P.O. Box 43172  
Olympia, WA 98504

RE: The Tesoro-Savage Project

Dear Mr. Posner,

Hello my name is Billie Jo Bray; I am the President of Visions for our Future (VFOF). Please consider granting us the opportunity to provide input on the Proposed Tesoro-Savage Project at the Port of Vancouver. Specifically, we urge EFSEC overturn the lease for the proposed Tesoro-Savage Project at the Port of Vancouver and would like to request the opportunity to provide input.

VFOF is an Indigenous Environmental Group settled on the Confederated Tribes of the Colville Indian Reservation whose members are from 12 different Indian Tribes throughout the west and along the Columbia River. VFOF recognizes its inherent rights and that of its membership to preserve and protect the L.A.W.S. (land, air, water and spirits) sacred connection with Mother Earth for the sake of the unborn seventh generation. VFOF works to preserve and protect a healthy sustainable ecosystem that includes historic harmony with respect for the every being's sacred connection to the web of life; whether the entities of the web walk with four legs, fly through the air, swim in the water, or burrow in the Earth. VFOF also promotes empowering communities through education and awareness of potential negative risks to the future unborn seventh generation L.A.W.S. from abusive projects such as mining, logging, agricultural uses or other activities that could cause impacts to water quality and quantity, traditional and cultural interests, fish and wildlife habitat.

VFOF recognizes the responsibility for EFSEC to approve a the comprehensive study that the Tesoro-Savage Project completes for the EIS, however it should have allowed public meetings to obtain comments. VFOF asks the EFSEC to consider conducting assessments, prioritizing investigations of water rights, subsistence fishing/hunting and cultural resources within proposed project areas. The VFOF group is also cognizant of the elevated risks of the proposed project and that it could cause potential life threatening impacts to the health and safety of L.A.W.S. sacred connection with Mother Earth for the unborn seventh generation, a historic way of life that is still maintained by VFOF members. The proposed lease areas should consider the elevated risks with Bitumen and establish standards for potentially unstable materials that could cause a threat for public health and safety, since we do not believe that the current

standards adequately address those risks. EFSEC has a duty to secure a plan that will maintain high standards and ensure the most efficient clean-up and emergency response to any potential negative impacts. VFOF understands that Dilbit has elevated risks as it is a highly corrosive and acidic material that has potential risks that could adversely impact L.A.W.S. in the event of an incident during transport.

Please consider the comments herein and provide us an opportunity to expound on our concerns relating to the proposed Tesoro-Savage Project. Thank you for your time and consideration. We look forward to the opportunity to fully comment on this issue in the interests of the environment and of course our obligation to guard our seventh generation's inherent rights.

Sincerely,

Billie Jo Bray  
President  
Visions for Our Future



Tesoro Savage CBR  
Scoping Comment  
#30726

## Docket EF-131590

(UTC)

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**From:** Rob Rich <rdr@shavertransportation.com>  
**Sent:** Wednesday, December 18, 2013 11:37 AM  
**To:** EFSEC (UTC)  
**Subject:** EFSEC comment for Tesoro/Savage Terminal  
**Attachments:** SEPA .docx

**Categories:** Red Category

attached is my personal letter to EFSEC review.

**Rob Rich**  
V.P. Marine Services  
Shaver Transportation Company  
*"Providing The Power Since 1880"*  
Phone: 503-228-8850 Fax: 503-274-7098  
Cell: 503-781-7635  
e-mail: [rdr@shavertransportation.com](mailto:rdr@shavertransportation.com)  
[www.shavertransportation.com](http://www.shavertransportation.com)

December 18, 2013

Mr. Stephen Posner  
Interim EFSEC Manager  
Energy Facility Site Evaluation Council  
P.O. Box 43172  
Olympia, WA 98504-3172

Dear Mr. Posner,

I am a 26 year resident of Vancouver Washington and am writing to express my support for the proposed Tesoro/Savage Vancouver Energy Distribution Terminal. This project as you are aware offsets overseas imports and declining US West Coast production by utilizing interior North American sources of crude for our West Coast refineries to meet our commercial and private citizen fuel needs. It not only benefits Washington State with jobs and investments, but helps bolster America's energy security as well.

As a resident of Vancouver who regularly frequents both the long established industrial and recreational waterfront, I believe safety and environmental reviews are essential to protect not only the local environment but the safety of operations undertaken in all industrial applications in our State. I respectfully request the Scope of the SEPA environmental analysis be purposefully focused on potential facility impacts directly related to its' design and operation, just like any other facility has been exposed to in the last two decades I have lived here. Particularly, I ask you consider the following site specific impacts in the SEPA review:

**Seismic exposure, spill prevention and response requirements that protect the environment, complying with established State and Federal air quality emission standards, protection of Columbia River water quality along with fish and wildlife resources, facility impact on local transportation and infrastructure and public services, and finally, a design that meets all the relevant established safety standards. In short, follow the same well vetted and established guidelines of review and siting that have served our state so well.**

I am dismayed that a SEPA EIS that looks beyond site based impacts as a response to vocal opposition and not on established sound review procedures is an overreach that may have collateral effects on the transportation of other commodities, such as agricultural products that are the foundation of much of the economy of not only Clark County but the State of Washington as well.

A balanced approach to a balanced project results in a balance of environmental stewardship and economic vitality that is dually important to our region. Thank you for your efforts in this process.

Best Regards,  
Rob Rich  
2608 NE 153<sup>rd</sup> Street  
Vancouver WA 98686



# Docket EF-131590

Tesoro Savage CBR  
Scoping Comment  
#30727

(UTC)

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**From:** Bonnie McKinlay <goto350pdx@gmail.com>  
**Sent:** Wednesday, December 18, 2013 11:54 AM  
**To:** EFSEC (UTC)  
**Subject:** Tesoro Savage Vancouver Energy Distribution Terminal  
**Attachments:** E&E\_on\_explosive\_Bakken\_oil\_12.5.13.pdf  
  
**Categories:** Red Category

EFSEC

Dear Mr. Posner,

When evaluating the future of the proposed **Tesoro Savage Vancouver Energy Distribution Terminal**, I urge you and EFSEC to carefully study the following impacts the terminal would have in our region and the earth.

-Can this terminal be considered a **target by terrorists**? Would such a designation cause an increased security threat in the Vancouver-Portland Metro areas? Would this designation add to our tax burden?

-As geologists tell us, our area is due for an **extreme earthquake** event. How can the safety of our public and other lifeforms be preserved by having this oil terminal in our midst?

-The increase in oil-by-rail traffic will diminish the public use of Amtrak. It will impact the shipment of farm and industrial products through our region. It will cause an **extensive rail overload**. Please investigate the rail overload.

-The majority of the world's climatologists and the World Bank tell us that to slow **future catastrophic effects of climate change**, we must immediately cut the use of carbon-based energy. How can the State of Washington and the EFSEC approve the Tesoro Savage Vancouver Energy Distribution Terminal without ignoring the climate realities of today's world?

The Bakken shale oil that would go through the Tesoro Savage Vancouver Energy Distribution Terminal contains "**potentially lethal hydrogen sulfide gases**". Information about this and the possible connection in the recent oil Quebec explosion can be found in the attached pdf. I request that you pursue a study on these compounds and the threat that it could mean for our communities, our Columbia River, and wildlife.

Thank you in advance for your careful examination of the issues that I have outlined.

Bonnie McKinlay  
[goto350pdx@gmail.com](mailto:goto350pdx@gmail.com)  
7112 SW 53rd Avenue  
Portland, OR 97219

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## THE POLITICS AND BUSINESS OF UNCONVENTIONAL ENERGY

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Print this story, sponsored by America's Natural Gas.

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### 8. TRANSPORT:

#### Explosive Bakken oil triggers alarm in wake of rail disaster

Published: Thursday, December 5, 2013

As Canadian officials continue to probe the July 6 oil train derailment and explosion that claimed 47 lives in Lac-Mégantic, Quebec, new revelations have emerged about the volatility of the crude involved in the deadly crash.

An investigation by Toronto's *Globe and Mail* found that U.S. scientists had long questioned the chemical makeup of crude from North Dakota's Bakken Shale play, where the Lac-Mégantic train was loaded.

A 2010 investigation by North Dakota geologists uncovered potentially lethal hydrogen sulfide gases in the oil -- the same substance that has drawn complaints from pipeline companies active in North Dakota, including Tesoro High Plains Pipeline and Enbridge Inc. (*EnergyWire*, Sept. 3).

Canadian transportation officials have also acknowledged that the oil in the ill-fated Montreal, Maine & Atlantic Railway train was classified incorrectly, although it was still considered flammable according to the industry standard.

Ed Belkaloul, head of the federal Transportation Safety Board in Quebec, said the Bakken crude on the MM&A train behaved "in a way that was abnormal," exploding in downtown Lac-Mégantic and destroying several buildings.

The intensity of the blasts surprised railway officials, who speculated that the crude may have contained higher concentrations of propane or methane.

"The explosions and everything, I didn't think crude oil did that," said Ed Pritchard, a former accident investigator with the U.S. Federal Railroad Administration.

The *Globe and Mail* found that the oil did not have to undergo testing when it was loaded in New Town, N.D., and that crude-by-rail shipments since the July 6 disaster have gone largely unexamined despite pledges from federal safety officials to ramp up inspections.

North Dakota oil producers have increasingly relied on rail transportation in recent years as pipeline infrastructure has failed to keep up with booming oil output (*EnergyWire*, Dec. 3). Roughly two-thirds of the 700,000 barrels per day of crude produced in North Dakota is currently shipped by freight rail companies such as BNSF Railway Co. and Canadian Pacific Railway Ltd.

CP's CEO Hunter Harrison has pressed for closer scrutiny of crude-by-rail movements, saying the Lac-Mégantic disaster kept him "awake at night."

"I wonder this: Do people know what is going by their front door?" he said.

Harrison likened the crude-by-rail boom -- on track to deliver more than 400,000 carloads of oil this year throughout North America -- to a "gold rush."

Paul Browning, CEO of refining company Irving Oil, agreed that more testing should be required for oil shipments. The crashed MM&A train had originally been destined for an Irving Oil refinery in New Brunswick.

"I think the important thing as the importer," he said, "is we need to be in a position to convince the regulators that we've done our due diligence to make sure we understand the content of the rail cars" (McNish/Robertson, *Toronto Globe and Mail*, Dec. 3). -- BS

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UTC)

**From:** Theodora Tsongas <ttsongas@gmail.com>  
**Sent:** Wednesday, December 18, 2013 3:47 PM  
**To:** EFSEC (UTC)  
**Cc:** Theodora A Tsongas  
**Subject:** Comments on scope of eis Tesoro-Savage Vancouver Oil Terminal

Comments on Proposed Tesoro-Savage Oil Terminal at Vancouver Washington.

I am Dr. Theodora Tsongas, an environmental health scientist and epidemiologist with 37 years experience evaluating the adverse human health effects of environmental pollution. I am commenting because of my concerns that the proposed oil terminal will have numerous adverse and irreversible effects on human health, on the local, regional and global environment and life-supporting ecosystems, and on the local and regional economy and commerce.

My concerns include but are not limited to the following:

Global climate change is a first priority and concern – extraction, transport, storage, shipping and burning of 380,000 barrels of oil per year will have a devastating adverse impact on the climate and will be nothing less than suicide for human life on earth.

There is increased potential for derailments and accidents with increased rail traffic, with potential for oil spills into the Columbia River and along the railway route. Furthermore, the Quebec oil train derailment killed more than 50 people and destroyed part of a town. There is increased risk of a similar incident here with increased traffic. Who will respond and be responsible for mishaps?

With increased rail, ship, and barge traffic, there will be increased diesel emissions and air pollution. Outdoor air pollution and particulate matter are known cancer causing agents. Diesel particulates are known cancer-causing agents and have adverse neurological, respiratory, and cardiac effects.

Increased rail traffic will increase noise exposure in communities all along the route as well as in neighborhoods around the terminal. Noise exposure is associated with hearing loss as well as cardiovascular disease, sleep disorders and effects on mental health.

Increased rail traffic will adversely affect communities in Vancouver and along the rail route with adverse health impacts as well as interference with commerce, loss of custom, loss of jobs in existing industries such as commercial and sport fishing, recreation and tourism, and agriculture. Increased rail traffic will have a direct adverse effect by increasing emergency response times leading to death and disability among persons not treated in a timely fashion, and property damage and loss. Railroads cut through the middle of many towns and cities along the routes affected by this proposal, reducing quality of life and livability as well as property values in numerous communities.

The state of Washington has identified potential threats to drinking water aquifers and intakes for Vancouver. How will these threats be quantified and addressed and prevented and by whom?

The city of Vancouver has millions of dollars invested in waterfront redevelopment plans. How can these succeed with a 42 acre oil terminal next door? Who will pay for these investor losses? Who will compensate the

City and its residents for loss of a valuable esthetic as well as commercial and irreplaceable community resource: the waterfront.

Because of these concerns, I respectfully request that the scope of the environmental impact statement (EIS) be detailed and comprehensive and include a comprehensive health impact assessment (HIA) with public scoping and review. The scope of the EIS must include an examination of the cumulative impacts of several regional proposals for coal, oil, and natural gas terminals. What will be their combined impact on the health, welfare, and commerce of affected communities? What will be their cumulative impact on the global climate and thus the survival of humankind?

The scope of the EIS must answer the following questions:

What will be the increases in toxic air pollutants produced by the terminal activities? How will these be measured and by whom? What will be the pollutant monitoring parameters for this facility and the neighborhoods adjacent to it? How will human and environmental exposures be measured? What will be the local and regional impacts of increased toxic air pollutants on local and regional communities, their health, and their welfare? What will be the health care costs of increased adverse health impacts and who will pay these costs? What will be the health and environmental impact of diesel emissions on local and regional communities produced by 4-6 oil tanker trains arriving and departing from the oil terminal. What will be the cumulative impacts of multiple oil and coal and gas transport through the cities and regions of the northwest?

The scope of the EIS must measure cumulative rail impacts including future traffic to proposed and permitted new or expanded coal terminals in the US and British Columbia and crude-by-rail to refineries and proposed terminals in Washington and elsewhere in the Northwest. The EIS must include a programmatic regional rail traffic study and a vessel traffic risk assessment that includes all current terminal proposals on the Columbia River. Proposed terminals would add 1000 coal bulkers, 624 coal barge tows, 125 LNG carriers, and over 400 oil tankers to river traffic.

With increased rail, ship, barge, and truck traffic, what will be the adverse health impacts on communities along the rail route, around the terminal and along the Columbia River? How will these health impacts be measured? Will there be continuous long term monitoring of local and regional populations for adverse health impacts, how will this be done, and who will do it? Who will pay for it?

What are the potential threats to local and regional water supplies by this proposal? How will these threats be prevented? What steps will the Terminal facility take to prevent any threat to water supplies, or for that matter, to prevent any and all threats to human health and the environment by its activities?

Who will be responsible for the costs of preventing contamination of drinking water or reductions in water quality in the local area and region? Who will be responsible for the costs of preventing harmful exposures and their resulting adverse health impacts?

Potentially impacted species which are federally listed, proposed for listing, and/or identified by Washington Dept of Fish and Wildlife as priority species in the Columbia River or vicinity, include Chinook, chum, coho, sockeye salmon, eulachon/smelt, bull trout, steelhead trout, resident/searuncutthroat trout (*O. clarki clarki*), white (Acipenser transmontanus) and green sturgeon, Pacific (*Lampetra tridentata*) and river lamprey (*L. ayresi*), Steller sea lions, California sea lions (*Zalophus californianus*), harbor seals (*Phoca vitulina*), and Sandhill cranes (*Grus canadensis*). What are the potential impacts on these endangered, priority, or listed species and how will these adverse impacts be prevented by the proponents of this oil terminal? What will be the extent and costs of loss of ecosystem services by adverse impacts on these and other species in the region? What will be the social, cultural and economic costs to communities in the region of the reduction or loss of these species as a result of adverse impacts of the proposed oil terminal? Who will bear the brunt of these costs?



The EIS and HIA must quantify the adverse health and environmental impacts of global climate change exacerbated by the activities of this oil terminal by providing a conduit for fossil fuels to be removed from the earth and subsequently burned. The adverse impacts of this terminal cannot be viewed as isolated in any way. What happens here happens to the world.

What are the environmentally sustainable alternatives to this proposed oil terminal? What are the health and environmental risks of environmentally sustainable alternatives? What would be the short and long term benefits to society (including job creation) of implementing sustainable alternatives to the proposed oil terminal?

When you have examined, through the comprehensive EIS and HIA, the potential impacts of the Tesoro-Savage Oil Terminal, and the potential impacts of sustainable alternatives, I urge you to deny the permits for this proposed oil terminal. Thank you for the opportunity to comment.

Tesoro Savage CBR  
Scoping Comment  
#30729

## Docket EF-131590

(UTC)

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**From:** Lovel Pratt <lovelpratt@gmail.com>  
**Sent:** Wednesday, December 18, 2013 11:40 AM  
**To:** EFSEC (UTC)  
**Subject:** Comments on Scope of EIS for Proposed Tesoro Savage Petroleum Terminal  
**Attachments:** Lovel\_Pratt\_EIS\_ScopingComments\_Tesoro\_Savage\_Vancouver\_Oil\_Terminal.pdf

**Categories:** Red Category

To Stephen Posner:  
Attached please find my comments on the scope of the EIS for the proposed Tesoro Savage Petroleum Terminal.  
Thank you for this opportunity to submit comments and secure standing in the EIS process.  
Lovel

Lovel Pratt  
2551 Cattle Point Road  
Friday Harbor, WA 98250  
360-378-7172

December 18, 2013

*Delivered via email: [efsec@utc.wa.gov](mailto:efsec@utc.wa.gov)*

Stephen Posner, EFSEC Interim Manager  
Energy Facility Site Evaluation Council  
PO Box 43172  
1300 S Evergreen Park Dr. SW  
Olympia, WA 98504-3172

RE: Comments on Scope of EIS for Proposed Tesoro Savage Petroleum Terminal LLC  
within Port of Vancouver, Washington

Dear Mr. Posner,

Thank you for this opportunity to comment on the scope of the Environmental Impact Statement (EIS) for the proposed Tesoro Savage Petroleum Terminal and to secure standing in the EIS process. The following comments identify potential adverse impacts that would occur if the proposed Tesoro Savage Petroleum Terminal is approved.

These scoping comments raise specific issues and potential adverse impacts that must be addressed in the EIS with in-depth analysis and with reasonable alternatives identified, including the no build option. If any comment is considered not to be significant and is not addressed in the EIS, I respectfully request and expect a thorough explanation. While the Tesoro Savage Petroleum Terminal is proposed to be located in Cowlitz County, Washington, the area of potential adverse impact is much greater.

I am a resident of San Juan County, a property owner, business owner, and a former member of the San Juan County Council. I am concerned that my quality of life and that of my fellow islanders in San Juan County would be adversely impacted by the proposed Tesoro Savage Petroleum Terminal. Our quality of life depends upon San Juan County's tourism-based economy and these economic drivers: our beautiful environment and our iconic Southern Resident Orca Whales.

- What would be the potential adverse impacts in and near the mouth of the Columbia River from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of oil spills to the Southern Resident Orca Whales that spend time at the mouth of the Columbia River where it is presumed that they are feeding on upper Columbia and Snake River Chinook salmon?<sup>1</sup>
- What would be the potential adverse impacts in and near the mouth of the Columbia River from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of oil spills, to the upper Columbia

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<sup>1</sup> <http://www.youtube.com/watch?v=8ApK0SYothA>

and Snake River Chinook salmon that are essential to the Southern Resident Orca Whales' diet?

- What would be the potential adverse impacts in San Juan County, including the increased risk of a major oil spill, from the increased vessel traffic (from any of Washington State's five refineries that would have to travel through and/or adjacent to the waters of San Juan County) associated with the propulsion fueling operations required by the proposed Tesoro Savage Petroleum Terminal's cargo vessels?
- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts to the health of San Juan County's residents and visitors from the increased vessel traffic, including any propulsion fuel particulate impacts on air quality?
- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of major oil spills, to San Juan County's environment?
- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of major oil spills, to San Juan County property values?
- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts to the Southern Resident Orca Whales, to San Juan County's tourism-based economy?
- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of major oil spills to San Juan County tourism, real estate sales, and housing construction related revenues?

I am taxpayer in San Juan County. I am concerned that my tax burden and that of my fellow islanders in San Juan County would be adversely impacted by the proposed Tesoro Savage Petroleum Terminal.

- What would be the potential adverse impacts from the proposed Tesoro Savage Petroleum Terminal, including the adverse impacts from the increased risk of major oil spills in San Juan County, and including the potential adverse impacts to San Juan County's shoreline and water-view property values and any potential redistribution of tax burden to all San Juan County property owners if shoreline property valuations are reduced?

I am a Washington State taxpayer. I am concerned that my tax burden and that of my fellow islanders in San Juan County and all the citizens of Washington State would be adversely impacted by the proposed Tesoro Savage Petroleum Terminal.

- What would be the cost to Washington State tax payers to address all the required transportation infrastructure improvements associated with the proposed Tesoro Savage Petroleum Terminal? San Juan County already ranks last of all 39 Washington State Counties in terms of per capita tax revenue generated vs.

per capita state expenditures (as of Fiscal Year 2011 – the most current analysis from the Office of Fiscal Management).<sup>2</sup>

Thank you for this opportunity to comment on the scope of the EIS for the proposed Tesoro Savage Petroleum Terminal and to secure my standing in the EIS process.

Sincerely,



Lovel Pratt  
2551 Cattle Point Road  
Friday Harbor, WA 98250

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<sup>2</sup>[http://www.ofm.wa.gov/fiscal/expenditures\\_and\\_revenues/state\\_expenditures\\_revenues\\_by\\_cty.pdf](http://www.ofm.wa.gov/fiscal/expenditures_and_revenues/state_expenditures_revenues_by_cty.pdf)

**UTC)**

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**From:** Larry Hampson <larryhampson2@q.com>  
**Sent:** Wednesday, December 18, 2013 4:01 PM  
**To:** EFSEC (UTC)  
**Subject:** Scoping Comments for Tesoro- Savage Proposed Crude Oil Facility

Dec. 18, 2013

Dear Council Members,

My main concerns are the emissions of diesel particulate matter on human health, and that Cheney, Spokane, and the Spokane Valley would see an increase of trains that would significantly increase human exposure to diesel PM.

I have studies that are below that I'd like to be analyzed as part of the scoping process especially on low income citizens, the elderly, children, the disabled, urban dwellers, and those who live and work within a mile of train tracks.

I also want analyzed how some citizens will be exposed to these diesel fumes who cannot escape for various reasons -poverty, work, school, and dwell- a high amount of exposure to diesel pm matter because they are stuck in the same place for most hours of a day. You need to analyze wind patterns in these areas which are generally from the SW.

Also analyze why BNSF does not have only Tier 4 engines (the types with less emissions) running, at least in the Pacific Northwest, due to the unprecedented amount of train traffic we could receive from coal and crude oil exports.

Being able to recreate, that is walk, cycle, etc. in the urban areas could also be seriously hampered from air pollution in terms of health. I want this analyzed within the context of increased coal and oil trains. Coal trains have to be taken into consideration because the traffic and air pollution issues from coal and oil trains cannot be separated from one another. They are all part of BNSF's rail system.

Here are the studies to analyze:

<http://www.sciencedaily.com/releases/2013/01/130131084424.htm> New study highlights impact of environmental change on older people.

<http://www.sciencedaily.com/releases/2013/02/130217134200.htm> Links between ozone levels and cardiac arrest analyzed.

<http://www.sciencedaily.com/releases/2013/03/130321205530.htm> Road traffic pollution as serious as passive smoke in the development of childhood asthma.

<http://www.abc.net.au/science/articles/2013/04/24/3743592.htm> Air pollution may harden arteries.

<http://ecowatch.com/2013/beautiful-poisoned-children-of-china/>

<http://www.sciencedaily.com/releases/2013/05/130509184817.htm> Air pollution increases risk of insulin resistance in children.

<http://www.sciencedaily.com/releases/2013/05/130513202447.htm> Living close to a major road may impair kidney function.

<http://www.sciencedaily.com/releases/2013/05/130515174027.htm> Breathing auto emissions turns HDL cholesterol from good to bad.

<http://www.sciencedaily.com/releases/2013/05/130520142745.htm> Air and noise pollution increase cardiovascular risk.

<http://www.sciencedaily.com/releases/2013/05/130520142747.htm> Prenatal exposure to traffic is associated with respiratory infection in young children.

<http://www.sciencedaily.com/releases/2013/06/130618101734.htm> Exposure to high pollution levels during pregnancy may increase risk of having child with autism.

<http://www.sciencedaily.com/releases/2013/06/130618131830.htm> Early life air pollution linked with childhood asthmas in minorities.

<http://www.theguardian.com/environment/2013/jul/04/europe-tackle-air-pollution->

<http://www.sciencedaily.com/releases/2013/07/130712084455.htm>  
Air pollution responsible for more than 2 million deaths world-wide each year.

<http://www.washingtonpost.com/blogs/worldviews/wp/2013/02/22/chinese-state-media-releases-a-map-showing-the-spread-of-cancer-villages/>

<http://www.sciencedaily.com/releases/2013/09/130904105145.htm> Air pollution worsened by climate change set to be most potent killer in 21st century.

<http://www.sciencedaily.com/releases/2013/08/130820102516.htm> Traffic pollution and wood smoke increases asthma in adults.

<http://www.sciencedaily.com/releases/2013/09/130908135621.htm> Road traffic pollution increases risk of death for bronchiectasis patients.

<http://www.sciencedaily.com/releases/2013/10/131007094229.htm> Air pollution increases heart attacks.

<http://www.sciencedaily.com/releases/2013/10/131007094500.htm> Air pollution and psychological distress during pregnancy.

<http://www.sciencedaily.com/releases/2013/05/130521011234.htm>; Early life traffic-related air pollution exposure linked to hyperactivity.

<http://grist.org/list/heavily-polluted-beijing-now-has-8-year-old-lung-cancer-patient/>

<http://www.sciencedaily.com/releases/2013/10/131007094500.htm> Air pollution and psychological distress during pregnancy.

<http://www.sciencedaily.com/releases/2009/11/091102171728.htm> Links between city walkability and air pollution.

Declining Air Pollution Levels Continue to Improve Life Expectancy in U.S.  
<http://www.sciencedaily.com/releases/2012/12/121203163538.htm>.

First Report of State-Level COPD Prevalence in U.S. WA State has less than 4% and we need to keep it that way. Air Pollution contributes to COPD.  
<http://www.sciencedaily.com/releases/2012/11/121121130943.htm>.

Bad Air Means Bad News for Seniors' Brainpower: Study done on 14,739 white, black, and Hispanic men and women aged 50 and older.  
<http://www.sciencedaily.com/releases/2012/11/121116161021.htm>

Even Moderate Air Pollution Can Raise Stroke Risks:  
<http://www.sciencedaily.com/releases/2012/02/120213185119.htm>.

Air Pollution Level Changes in Beijing Linked With Biomarkers of Cardiovascular Disease;  
<http://www.sciencedaily.com/releases/2012/05/120515165407.htm>.

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<http://www.sciencedaily.com/releases/2012/04/120417221835.htm>.

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<http://www.sciencedaily.com/releases/2112/02/120214171040.htm>.

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<http://www.sciencedaily.com/releases/2009/07/090720111453.htm>. Children's IQ Can Be Affected By Mother's Exposure to Urban Air Pollutants.

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<http://www.sciencedaily.com/releases/2012/09/120911091353.htm> Substantial road traffic noise in urban areas contributes to sleep disturbance and annoyance.

<http://www.sciencedaily.com/releases/2013/11/131120133733.htm> How humans perceive sound and how noise pollution is a part of it.

<http://www.sciencedaily.com/releases/2012/06/120611105311.htm> Half of inhaled soot particles, diesel exhaust, fires, get stuck in lungs

<http://www.sgvtribune.com/general-news/20120310/new-study-says-diesel-emissions-can-increase-risk-of-cancer-three-fold>

<http://www.sciencedaily.com/releases/2012/06/120611105311.htm> Nanoparticles in polluted air, smoke and nanotechnology products have serious impact on health

No doubt, you will find other links from the above links.

You need to scope for each individual city or town all along the rails from the Bakken Oil fields to the Port of Vancouver, looking at the speeds through town compared to how much vehicular traffic each intersection gets, to determine how many vehicles, and how long it takes to get through an intersection including the time it takes for crossing gates to lower and traffic backing up and waiting. This will increase with more coal and oil trains on the tracks in an already overloaded system. Even if the train goes through relatively quickly, vehicle traffic takes awhile to get started up again to get through an intersection and the delay of slowing down for the train to cross, and the delay of getting the traffic across the tracks could be significant. Busses and trucks generally take longer to get started up and longer going through intersections. Cumulatively this will take longer and longer.

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the delays in traffic will cause problems with emergency responders, commuter traffic, and school busses.

Please go to [www.heavytrafficahead.org](http://www.heavytrafficahead.org) and include it in scoping. It will be updated soon to include Bakken oil trains and I ask that when the update is complete, it be included as a part of the analysis of scoping.

I also reiterate, for the sake of brevity, the oral and written comments of Bart Mahailovich, Spokane Riverkeeper, Marla Nelson, Rick Eichsteadt, Jace Bylenga, and Mike Petersen, ED of The Lands Council.

All of the aspects of how these oil trains will contribute to global climate change need to be analyzed. Governor Inslee formed the CLEW, CLimate Legislative Executive Workshop on greenhouse gas reductions in the state of WA. Analyze how an increase of Bakken oil and perhaps later, tar sands oil from Canada, will increase our greenhouse gases in this state and world-wide, increase global warming and decrease our ability to move from fossil fuels to clean, sustainable energy.

Please see the 5th assessment report (AR5) from the IPCC: <http://ipcc.ch/>, and scope it.

Thank you for this opportunity to comment.

Sincerely,  
Laura Ackerman  
3118 S. Windsor Rd.  
Spokane WA 99224  
[simahafarm@gmail.com](mailto:simahafarm@gmail.com)

**From:** Laura Ackerman <simahafarm@gmail.com>  
**Sent:** Wednesday, December 18, 2013 11:21 AM  
**To:** EFSEC (UTC)  
**Subject:** Scoping Comments for Tesoro- Savage Proposed Crude Oil Facility

Dec. 18, 2013

Dear Council Members,

I testified at the hearing in Spokane Valley on Dec.11, 2013. Thank you for holding a hearing in the Spokane area on the above proposal. My main concern was the emissions of diesel particulate matter on human health, and that Cheney, Spokane, and the Spokane Valley would see an increase of trains that would significantly increase human exposure to diesel PM.

As I mentioned in my oral comments I have studies that are below that I'd like to be analyzed as part of the scoping process especially on low income citizens, the elderly, children, the disabled, urban dwellers, and those who live and work within a mile of train tracks.

I also want analyzed how some citizens will be exposed to these diesel fumes who cannot escape for various reasons -poverty, work, school, and dwell- a high amount of exposure to diesel pm matter because they are stuck in the same place for most hours of a day. You need to analyze wind patterns in these areas which are generally from the SW.

Also analyze why BNSF does not have only Tier 4 engines (the types with less emissions) running, at least in the Pacific Northwest, due to the unprecedented amount of train traffic we could receive from coal and crude oil exports.

Being able to recreate, that is walk, cycle, etc. in the urban areas could also be seriously hampered from air pollution in terms of health. I want this analyzed within the context of increased coal and oil trains. Coal trains have to be taken into consideration because the traffic and air pollution issues from coal and oil trains cannot be separated from one another. They are all part of BNSF's rail system.

Here are the studies to analyze:

<http://www.sciencedaily.com/releases/2013/01/130131084424.htm> New study highlights impact of environmental change on older people.

<http://www.sciencedaily.com/releases/2013/02/130217134200.htm> Links between ozone levels and cardiac arrest analyzed.

<http://www.sciencedaily.com/releases/2013/03/130321205530.htm> Road traffic pollution as serious as passive smoke in the development of childhood asthma.

<http://www.abc.net.au/science/articles/2013/04/24/3743592.htm> Air pollution may harden arteries.

<http://ecowatch.com/2013/beautiful-poisoned-children-of-china/>

<http://www.sciencedaily.com/releases/2013/05/130509184817.htm> Air pollution increases risk of insulin resistance in children.

<http://www.sciencedaily.com/releases/2013/05/130513202447.htm> Living close to a major road may impair kidney function.

<http://www.sciencedaily.com/releases/2013/05/130515174027.htm> Breathing auto emissions turns HDL cholesterol from good to bad.

<http://www.sciencedaily.com/releases/2013/05/130520142745.htm> Air and noise pollution increase cardiovascular risk.

<http://www.sciencedaily.com/releases/2013/05/130520142747.htm> Prenatal exposure to traffic is associated with respiratory infection in young children.

<http://www.sciencedaily.com/releases/2013/06/130618101734.htm> Exposure to high pollution levels during pregnancy may increase risk of having child with autism.

<http://www.sciencedaily.com/releases/2013/06/130618131830.htm> Early life air pollution linked with childhood asthmas in minorities.

<http://www.theguardian.com/environment/2013/jul/04/europe-tackle-air-pollution->

<http://www.sciencedaily.com/releases/2013/07/130712084455.htm>  
Air pollution responsible for more than 2 million deaths world-wide each year.

<http://www.washingtonpost.com/blogs/worldviews/wp/2013/02/22/chinese-state-media-releases-a-map-showing-the-spread-of-cancer-villages/>

<http://www.sciencedaily.com/releases/2013/09/130904105145.htm> Air pollution worsened by climate change set to be most potent killer in 21st century.

<http://www.sciencedaily.com/releases/2013/08/130820102516.htm> Traffic pollution and wood smoke increases asthma in adults.

<http://www.sciencedaily.com/releases/2013/09/130908135621.htm> Road traffic pollution increases risk of death for bronchiectasis patients.

<http://www.sciencedaily.com/releases/2013/10/131007094229.htm> Air pollution increases heart attacks.

<http://www.sciencedaily.com/releases/2013/10/131007094500.htm> Air pollution and psychological distress during pregnancy.

<http://www.sciencedaily.com/releases/2013/05/130521011234.htm>; Early life traffic-related air pollution exposure linked to hyperactivity.

<http://grist.org/list/heavily-polluted-beijing-now-has-8-year-old-lung-cancer-patient/>

<http://www.sciencedaily.com/releases/2013/10/131007094500.htm> Air pollution and psychological distress during pregnancy.

<http://www.sciencedaily.com/releases/2009/11/091102171728.htm> Links between city walkability and air pollution.

Declining Air Pollution Levels Continue to Improve Life Expectancy in U.S.  
<http://www.sciencedaily.com/releases/2012/12/121203163538.htm>.

First Report of State-Level COPD Prevalence in U.S. WA State has less than 4% and we need to keep it that way. Air Pollution contributes to COPD.  
<http://www.sciencedaily.com/releases/2012/11/121121130943.htm>.

Bad Air Means Bad News for Seniors' Brainpower: Study done on 14,739 white, black, and Hispanic men and women aged 50 and older.  
<http://www.sciencedaily.com/releases/2012/11/121116161021.htm>

Even Moderate Air Pollution Can Raise Stroke Risks:  
<http://www.sciencedaily.com/releases/2012/02/120213185119.htm>.

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Thank you for this opportunity to comment.

Sincerely,  
Laura Ackerman  
3118 S. Windsor Rd.  
Spokane WA 99224  
[simahafarm@gmail.com](mailto:simahafarm@gmail.com)

(UTC)

**From:** Kathleen & Stephen Hulick <kaweah50@gmail.com>  
**Sent:** Wednesday, December 18, 2013 1:37 PM  
**To:** EFSEC (UTC)  
**Subject:** Vancouver Oil Terminal (Tesoro/Savage)  
**Attachments:** 12.11 (WSJ) Exxon Article.pdf  
  
**Categories:** Red Category

Dear Council Members,

I believe that there are many reasons why the oil terminal proposal should be rejected. Most have been covered by others and myself in prior comments to you. And just recently the City of Vancouver has asked for a comprehensive scoping of the project. I am glad that the City is aware of the possible effects on its well being. Three aspects of the project have not been addressed in any great detail. I want you to be aware of them as you go forward with your deliberations.

1. The Port of Vancouver has borrowed approx. \$275 million for infrastructure improvements. These costs are being paid for by increased taxes on the part of the taxpayers of Clark County. The improvements were planned for and are substantially for the rail upgrades to accommodate the anticipated 4-6 oil unit trains per day arriving at the port. The Requests For Proposal (RFP) were solely for oil, showing that the Port's intention in borrowing was for an oil project. So the public is "chipping in" over \$200 million to subsidize Tesoro/Savage's private enterprise project. That is not fair to the taxpayers and in my opinion is an abuse of the public trust by the Port Commissioners and the Port. At the minuscule lease amount of \$4.5 million per year this amount might be repaid by the end of my grandchildren's lives.

Lastly, the insurance amount \$25 million required of Tesoro/Savage in the lease agreement is a pittance compared to what will actually be needed when a major accident happens at the terminal. The insurance should be somewhere north of \$500 million.

2. In your Vancouver hearing Tesoro/Savage told you of and showed to you on maps, the destinations for the crude oil after it has been transferred to ships. The destinations were said to be California refineries. I believe that is partially true. I believe that at the same time and from the very beginning the plan has been to be in a position to export the crude oil directly overseas. It would seem to make more sense to ship by rail directly to refineries than to invest this large amount of money in a rail to ship transfer scheme. The rail to ship through Vancouver idea does make sense if one intends to get the oil to sea by the most direct route.

The Council and the public were misled by Tesoro/Savage. As a member of the public I resent this. One argument made by Tesoro/Savage in favor of the project is that it will help the U.S. become more energy independent and help lower the price of gasoline and diesel. However, if the oil can be exported it will be sold to the highest bidder and the American public will lose any price benefit. Enclosed are links to two newspaper articles that show that Tesoro, the American Petroleum Institute (lobbyist for the oil industry) and Exxon have been and are working to change the federal law (1975 Energy Policy and Conservation Act) that prohibits export of U.S. crude oil. This law should be maintained. In the Vancouver Columbian article Stephen Brown of Tesoro is quoted.

I am also communicating this fact to our U.S. Senators Murray and Cantwell and Governor Inslee. The risk involved in the entire project should not be borne just so the oil can be exported. The Port and Tesoro should not be allowed to deceive the public and get away with it.

If this link does not take you to the article a PDF of the (WSJ) Exxon article is attached.



<http://online.wsj.com/news/articles/SB10001424052702304202204579252393756212898>

**U.S. export ban on oil may face challenge | The Columbian**



3. The shipment of oil by rail through Washington is not taxable by the state and therefor the state will not receive any tax revenue from oil transportation on this project. If the oil came through by pipeline it would be taxable. Again, enormous risk for little if any return on risk.

Thank you for your service to the people of Washington.

Regards,

Stephen J. Hulick  
16607 N.E. 197th Ave.  
Brush Prairie, WA 98606  
Ph. 360-535-9503

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BUSINESS

## Exxon Presses for Exports

U.S.'s Largest Energy Producer Says North America Has Abundant, Long-Lasting Fuel Supplies

By DANIEL GILBERT **CONNECT**

Dec. 11, 2013 11:04 p.m. ET

Exxon Mobil Corp. XOM +2.77% , the nation's largest energy producer, is calling for the U.S. to lift restrictions on exporting domestic oil that date back to the Arab oil embargo of 1973.

The Irving, Texas, company's public support for crude exports comes as it forecasts decades of abundant supplies of petroleum in the U.S. and elsewhere as well as increasing global demand for oil, according to its annual energy outlook set to be released on Thursday.

"We are not dealing with an era of scarcity, we are dealing with a situation of abundance," Ken Cohen, Exxon's vice president of public and government affairs, said in an interview. "We need to rethink the regulatory scheme and the statutory scheme on the books."

By 2015, energy companies will tap more oil in North America from dense layers of rock alone than the current output of members of the Organization of the Petroleum Exporting Countries except Saudi Arabia, Exxon projects.

World-wide, companies will pump greater amounts of oil through 2040 and still leave nearly two-thirds of the earth's crude deposits untouched, Exxon says.

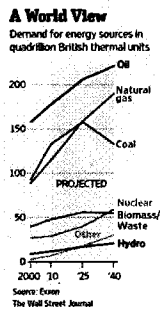
[Enlarge Image](#)



The U.S. allows some oil to be shipped to Canada, but bans most other exports of crude. *Reuters*

Oil and gas are becoming more abundant, Exxon contends, as new technologies make it possible to draw the fuels from deep under the world's oceans, oil sands deposits and tight rock formations like shale. The sheer abundance of oil and gas in the U.S. poses challenges for Exxon. Booming production has overwhelmed U.S. demand, pushing domestic prices lower and eroding profit margins for energy producers.

Exxon has long held that the same trade rules should apply to oil and gas as other products made in the U.S., and has said that North America was pumping enough oil and gas to become an exporter. But now the world's largest investor-owned energy company is explicitly calling for an end to America's effective ban on most crude exports.



In the past year, Royal Dutch Shell RDSB +1.69% PLC and

ConocoPhillips COP +0.49% also have called for the U.S. to permit crude exports.

Such a push is likely to meet stiff resistance from energy consumers worried that exporting crude could lead to higher U.S. fuel prices, as well as those concerned about the environmental effects of increased production. It could also stir opposition from companies that refine oil into gasoline and diesel, and benefit from less expensive crude.

The U.S. allows some oil to be shipped to Canada, but bans most other exports of crude. Some companies, including Exxon, are already seeking to export natural gas to countries willing to pay a premium for it. The U.S. government has approved licenses for several terminals to export natural gas, chilled into liquid form, to countries with which it doesn't have a free-trade agreement.

Exxon estimates that the world will consume 35% more energy in 2040 than in 2010, led by population growth and rising incomes in India, China and other developing countries. Oil and gas will provide about 60% of the energy needed in 2040, compared with 7% from hydropower and other renewables, it projects.

The company increasingly is optimistic about how much oil can be recovered with today's technology, predicting 65% of the world's crude will be untapped by 2040. A year ago, the company estimated the world would have used "less than half" of its oil resources. The numbers don't reflect whether the oil can be produced profitably.

BP BPLN -0.02% PLC, which annually publishes its own energy outlook, says no one "can know how much oil exists under the earth's surface or how much it will be possible to produce."

Despite North America's surging oil output, Exxon projects that the biggest increase will come from the Middle East. By 2040,

45% of the world's supplies of oil and related liquid fuels will come from OPEC, up from 40% in 2010, it estimates.

Much the world's remaining oil won't be easy or cheap to produce. In its outlook, Exxon highlights innovations such as Arctic oil platforms that can withstand icebergs, and wells that extend seven miles to reach underwater crude deposits. In addition, the energy company projects that carbon emissions will cost \$80 a ton by 2040 as governments move to curb greenhouse gases, adding to its costs.

The oil giant's outlook marks a continuing divide with environmentalists and some governments that advocate limiting fossil-fuel use to curb carbon emissions, warning that they trap heat in the atmosphere and warm the planet. The International Energy Agency has called for a 50% reduction in oil consumption by 2050, a view Exxon executives dismiss as unrealistic.

Instead, Exxon envisions global emissions peaking in 2030, as coal increasingly is displaced by natural gas, which emits roughly half as much carbon when burned to generate electricity. Unconventional sources of gas, such as shale, will make up a third of the world's gas supplies by 2040, the company predicts.

**Write to** Daniel Gilbert at [daniel.gilbert@wsj.com](mailto:daniel.gilbert@wsj.com)

**From:** Zimmerman, Samantha <szimmerman3@lawschool.gonzaga.edu>  
**Sent:** Wednesday, December 18, 2013 2:17 PM  
**To:** EFSEC (UTC)  
**Cc:** ricke@cforjustice.org  
**Subject:** FW: Message from "RNPFC7A99"  
**Attachments:** 20131218142426290.pdf

**Categories:** Red Category

Hello, I am Samantha Zimmerman and I am a legal intern at the Gonzaga University Environmental Law Clinic. Attached is a comment letter I wrote regarding the proposed Tesoro Savage oil-by-rail export project. Thank you for your consideration of these comments.

Samantha Zimmerman  
Legal Intern

Gonzaga University Environmental Law Clinic

---

From: [ulascanner@lawschool.gonzaga.edu](mailto:ulascanner@lawschool.gonzaga.edu) [[ulascanner@lawschool.gonzaga.edu](mailto:ulascanner@lawschool.gonzaga.edu)]

Sent: Wednesday, December 18, 2013 2:24 PM

To: Zimmerman, Samantha

Subject: Message from "RNPFC7A99"

This E-mail was sent from "RNPFC7A99" (Aficio MP 6001).

Scan Date: 12.18.2013 14:24:26 (-0800)

Queries to: [ulascanner@lawschool.gonzaga.edu](mailto:ulascanner@lawschool.gonzaga.edu)

## UNIVERSITY LEGAL ASSISTANCE

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LARRY A. WEISER

Office Manager  
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JENNIFER A. GELLNER  
GAIL HAMMER  
JUDGE RICHARD WHITE (ret.)

JAMES P. CONNELLY  
MARK E. WILSON  
*Of Counsel*

December 18, 2013

### *VIA E-Mail Transmission*

Stephen Posner, Interim Manager  
Energy Facility Site Evaluation Council (EFSEC)  
P.O. Box 43172  
Olympia, WA 98504

### **RE: Crude Oil Exports**

Dear Mr. Posner:

I am writing on behalf of the Gonzaga University Environmental Law Clinic.

The Environmental Law Clinic provides legal representation to non-profit environmental organizations throughout the Inland Northwest. We strive to protect and restore the ecological integrity of the region's natural resources, and to ensure compliance with environmental laws through advocacy and public interest litigation.

It has come to my attention that Tesoro Savage is proposing to build a crude oil transit terminal at the Port of Vancouver, Washington. This rail would transport crude oil from the Bakken fields in North Dakota, directly through Spokane, to Vancouver. The terminal would be the largest crude oil transit terminal on the West Coast, and almost half the capacity of the Keystone XL pipeline. These trains would carry a "staggering 360,000 barrels of crude oil each day by rail along the Columbia River."<sup>1</sup> "At 360,000 barrels of oil per day, the terminal will ship over 131 million barrels of crude oil per year."<sup>2</sup> To transport this massive amount of oil, the terminal "would require 1,460 trains per year . . . to pass through Vancouver neighborhoods."<sup>3</sup>

Oil transportation will cause great environmental and economic harm, and it has the potential to cause devastating harm to our health and safety. All of the communities near the railroads will be affected by the transportation of oil, not just the Port of Vancouver. Thus, the scope of the Environmental Impact Statement (EIS) should be broad and address the cumulative impacts of all of the negative effects of oil transportation on all the areas in which the oil trains would pass through.

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<sup>1</sup> See <http://columbiariverkeeper.org/wpcontent/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>2</sup> See <http://columbiariverkeeper.org/wpcontent/uploads/2013/07/2013.7.8-FINAL-Letter-to-POV-re-Tesoro-Savage.pdf>

<sup>3</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.7.8-press-release-Port-of-Vancouver-may-reconsider-vote-on-oil-terminal-after-oil-train-disaster.pdf>

## I. Environmental Impact

Oil transportation has the potential to cause catastrophic environmental harm. Increasing the number of oil trains on the rails naturally increases the chances that a train will derail. As I discuss later in this letter, if an oil train does derail, it will create a huge oil spill that would harm communities economically and health-wise. In terms of the environment, it would cause great harm to fish habitat because many of the railroad tracks run right by the Spokane and Columbia rivers.<sup>4</sup> Though it may seem like the odds of an oil train derailling is very slim, “[o]il-by-rail catastrophes are not theoretical.”<sup>5</sup> Just this past summer, a crude oil train in Lac Megantic, Quebec derailed, killing almost 50 people.<sup>6</sup> Just last month, an oil train derailed in Alabama, causing “some dozen of the cars [to go] up in flames...in the most dramatic U.S. accident since the oil-by-rail boom began.”<sup>7</sup> Clearly, train derailment is a legitimate threat and the EIS needs to address the potential environmental harm caused by derailments.

The process of extracting the crude oil may also harm the environment. Oil companies extract Bakken crude oil through a process known called hydraulic fracturing (a.k.a. “fracking”).<sup>8</sup> “Fracking” is “the process of drilling and injecting fluid into the ground at high pressure in order to fracture the shale rocks to release natural gas inside.”<sup>9</sup> The fluid consists of “millions of gallons of water, sand and chemicals ... Scientists are worried that the chemicals used in fracturing may pose a threat either underground or when waste fluids are handled and sometimes spilled on the surface.”<sup>10</sup> In 2011, the oil and gas industry reported over 1,000 spills of wastewater, drilling fluids, or other materials in North Dakota alone.<sup>11</sup> Fracking has also been known to pollute aquifers and harm agricultural lands.<sup>12</sup> In addition, the combustion of this oil will harm the environment because it will contribute to global warming by increasing greenhouse gas emissions. “Combustion of this oil alone will release over 56 million metric tons of carbon dioxide each year, *as much as almost 12 million cars worth of greenhouse gas pollution.*”<sup>13</sup>

## II. Health and Safety Concerns

This oil-by-rail proposal poses serious health and safety hazards to all communities near the rail lines. First, oil transportation would contribute to air pollution and make the air we all breathe dirtier.<sup>14</sup> “The health dangers of diesel particulate emissions from rail yards are well-known. Increased incidence of

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<sup>4</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>5</sup> See id.

<sup>6</sup> See id.

<sup>7</sup> See [http://www.huffingtonpost.com/2013/11/11/alabama-oil-train-derailment\\_n\\_4252887.html](http://www.huffingtonpost.com/2013/11/11/alabama-oil-train-derailment_n_4252887.html)

<sup>8</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>9</sup> See <http://www.dangersoffracking.com/>

<sup>10</sup> See <http://www.propublica.org/special/hydraulic-fracturing-national>

<sup>11</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>12</sup> See id.

<sup>13</sup> See id.

<sup>14</sup> See id.



cancer, asthma, and respiratory and cardiac conditions are attributed to inhaling diesel particulate matter.”<sup>15</sup> Secondly, the crude oil itself poses serious health risks.

North Dakota Bakken crude oil is associated with high levels of hydrogen sulfide gas... a[n] extremely hazardous gas formed by the breakdown of organic matter in the absence of oxygen. Earlier this year the discovery of perilous concentrations of hydrogen sulfide gas in a crude oil tank “sparked a furious row” between pipeline operator Enbridge and Bakken crude shippers. Enbridge found 1,200 ppm in one of its storage tanks at its oil-loading rail terminal. Exposure to sulfide gas vapors at levels of 100 ppm can cause death ... Chronic exposure to sul[f]ide gas can cause lung, liver and kidney damage, infertility, immune system suppression, disruption of hormone levels, blood disorders, gene mutations, birth defects, and cancer.<sup>16</sup>

Another concern with the oil trains is that they would greatly exacerbate traffic congestion on the railroads. The proposed terminal would require at least four unit trains per day.<sup>17</sup> “According to Tesoro Savage, each train includes 120 cars or more and extends *almost a mile and a half long*.”<sup>18</sup> These long trains “would exacerbate traffic delays in communities along the rail lines in Washington, such as Spokane, Washougal, and Vancouver.”<sup>19</sup> These increased traffic delays could slow response time for emergency responders by forcing them to wait until the train has passed the crossing to get to an emergency. A “comprehensive Coal Train Traffic Impact Study” Seattle conducted last year confirms the seriousness of this risk.<sup>20</sup> “The study found that a 1.6 mile- long train traveling at 30mph would cause a “gate down time” delay of 3.7 minutes. At 20 mph, the delay would increase to 5.3 minutes. And at 10 [miles per hour], the delay would be 10.2 minutes.”<sup>21</sup> Though this study looked at coal trains, the results of the study apply to the crude oil trains in Vancouver because the issue of traffic congestion is the same for both oil and coal trains.<sup>22</sup> I think most people would agree that slowing emergency responders is a serious risk that EFSEC needs to take into account in the decision of whether or not to allow an oil terminal to be built.

Lastly, as aforementioned, there is a very real chance that one of these oil trains could derail. An oil spill could seriously injure or kill anyone near the railroad tracks, as was tragically demonstrated in Quebec when an oil train derailment nearly killed 50 people and forced 2,000 residents to evacuate.<sup>23</sup> We really need to ask ourselves if oil transportation is worth the risk of such a catastrophe, and I think most people would agree with me in thinking that it is not.

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<sup>15</sup> See id.

<sup>16</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.7.8-FINAL-Letter-to-POV-re-Tesoro-Savage.pdf>

<sup>17</sup> See <http://columbiariverkeeper.org/events/efsec-comment-period-for-tesoro-savage-project/>

<sup>18</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>19</sup> See id.

<sup>20</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/01/2013.7.8-FINAL-Letter-to-POV-re-Tesoro-Savage.pdf>

<sup>21</sup> See id.

<sup>22</sup> See id.

<sup>23</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.7.8-press-release-Port-of-Vancouver-may-reconsider-vote-on-oil-terminal-after-oil-train-disaster.pdf>

### III. Economic Impact

This oil terminal proposal could cause great economic harm to all the communities in which the trains pass through. As explained above, there is a very realistic chance that an oil train could spill. Oil spills would cause “dramatic harm to ... nearby neighborhoods and businesses along the proposed rail route.”<sup>24</sup> If an oil train spills near a business, that company may have to spend money cleaning up the mess, or they may be forced to shut down their business while the mess is being cleaned and thus lose profits from having to close. Additionally, the company will lose business because customers would be deterred from going to an area that is covered in oil.

Not only could this proposal harm communities economically, it will not bring our community any economic benefits either. Unlike the coal terminal proposals that may bring some jobs to the region, the oil terminal will not create any jobs in any area other than Vancouver. Even in Vancouver, the number of jobs the terminal is projected to create is minimal. Therefore, there is no logical reason why people should support a project that gives our community no economic benefit and may actually cause great harm.

Vancouver in particular stands to suffer economic harm from these oil trains. Currently, the city’s waterfront is undergoing a \$1.3 billion redevelopment project, and it “has attracted millions of public dollars in public investment.”<sup>25</sup> The site, formerly an industrial site, will include “high-rises, offices, parks, and shops.”<sup>26</sup> “The real estate developer charged with remaking Vancouver’s waterfront warned the Port of Vancouver that safety concerns surrounding the Tesoro Savage terminal and rail traffic might make it tougher for him to pull off the showcase project.”<sup>27</sup> Thus, a project that could really boost Vancouver’s economy and bring them substantial revenue is being jeopardized by a project that gives Vancouver almost no economic benefit.

### IV. Cumulative Impacts

Cumulative impacts are the “combined, incremental effects of human activity” that “accumulate over time.”<sup>28</sup> The assessment of cumulative impacts is one of the most important aspects of an EIS because “[e]vidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time.”<sup>29</sup> Thus, simply looking at how a project, such as the oil trains, will affect a community now, or looking at how a single community will be affected versus all the surrounding communities, is not enough.

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<sup>24</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>25</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.10.15-Tesoro-Savage-Fact-Sheet-for-EFSEC-Hearing.pdf>

<sup>26</sup> See id.

<sup>27</sup> See id.

<sup>28</sup> See <http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf>

<sup>29</sup> See <http://www.shiplegroup.com/news/articles/0505.pdf> (internal citation omitted)

Stephen Posner, Interim Manager  
Energy Facility Site Evaluation Council (EFSEC)  
December 18, 2013  
Page 5

Dr. Paul Goldstein, Ph.D., who is a professor of toxicology, has cautioned that:

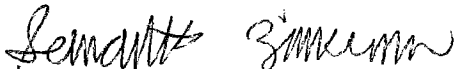
[c]rude oil is not readily biodegradable, and the effects of exposure to this toxin will be felt not only acutely, but from generation to generation.... All exposures, no matter how seemingly insignificant, may prove to be consequential. What may seem to be a relatively trivial exposure in a healthy individual may potentially prove catastrophic, and the consequences of both acute and chronic exposures to crude oil may take years, even decades, to fully reveal the array of disease and morbidity than will result from exposure to this substance.<sup>30</sup>

Thus, the EFSEC needs to look at all of the negative effects of oil exportation and the potential negative effects it could cause over time in its EIS. In addition, since these trains will be going through multiple cities throughout Washington, all those cities will experience the same problems and negative side effects of oil exportation. Thus, I strongly recommend that the EFSEC does a geographically broad cumulative impact statement that looks at how oil exportation will affect West Coast communities near the rails in regards to the factors listed above (health hazards, environmental harm, etc.).

Thank you for your consideration of these comments. If we can be of any further assistance in your review of these comments, please do not hesitate to contact us at the number listed above.

Sincerely,

UNIVERSITY LEGAL ASSISTANCE

  
Samantha Zimmerman  
Law Clerk

SZ/rke/vly

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<sup>30</sup> See <http://columbiariverkeeper.org/wp-content/uploads/2013/07/2013.7.8-FINAL-Letter-to-POV-re-Tesoro-Savage.pdf>

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**From:** Christina Skirvin <christina@columbiariverkeeper.org>  
**Sent:** Wednesday, December 18, 2013 1:28 PM  
**To:** EFSEC (UTC)  
**Subject:** Comments on Tesoro Savage Project  
**Attachments:** 2013.12.18.Tesoro Savage Project Comments.pdf  
  
**Categories:** Red Category

Dear Governor Inslee, Mr. Posner, and Washington EFSEC,

Please see the attached document for signatures and comments to our organization's (Columbia Riverkeeper) petition regarding the proposed Tesoro Savage project at the Port of Vancouver.

After carefully considering the safety, environmental, and climate risks associated with the project, we all respectfully ask you to deny Tesoro Savage's application. Thank you.



Christina Skirvin | Program Administrator  
Columbia Riverkeeper | 111 Third Street, Hood River, OR 97031  
503.784.5324 | [christina@columbiariverkeeper.org](mailto:christina@columbiariverkeeper.org)



[www.columbiariverkeeper.org](http://www.columbiariverkeeper.org)



This email is free from viruses and malware because avast! Antivirus protection is active.

December 18, 2013

Stephen Posner  
Interim EFSEC Manager  
Energy Facility Site Evaluation Council  
PO Box 43172  
1300 S Evergreen Park Dr. SW  
Olympia, WA 98504-3172

via email: efsec@utc.wa.gov

### **Deny the Proposed Tesoro Savage Pipeline-on-Wheels Project**

Dear Governor Inslee, Mr. Posner, and Washington EFSEC,

I urge you to assess the full impact of Tesoro Savage's proposal to ship 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's unprecedented proposal.

The public safety and environmental impacts of the state's largest pipeline-on-wheels proposal deserve close scrutiny. For example, EFSEC must assess:

- The potential impacts of a large train-related oil spill along the rail route in Washington and beyond.
- The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.
- The increased risk of an oil tanker spill on Washington State waters and along the shipping route.
- The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave.

After carefully considering the safety, environmental, and climate risks associated with the project, I respectfully ask you to deny Tesoro Savage's application.

Sincerely,

First Name	Last Name	Email	Zip	State	Comment: Let Governor Insee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Mary	Abramson	mehath1@aol.com	98513	WA	This oil is volatile! as we all have seen by the explosion, derailment and 47 deaths in Canada. As Governor of our WA you MUST SAY "NO" to this company. IT IS NOT SAFE!!
Mary	Addams	maryaddamsor@yahoo.com	97402	OR	We've got to stop poisoning our planet!- We all have to do our part in stopping the death of humanity that will surely come from the continuation of CO2 and other greenhouse gas emissions.
Peter	Albrecht	petenpals@hotmail.com	99217	WA	
Joan	Allen	blessjoan@hotmail.com	83864	ID	
Catherine	Al-Mieten	calmeten@gmail.com	97103	OR	I live on the River at the mouth in Astoria, Oregon, and watch the ships come and go. We are working hard to heal the River and her tributaries, and to find sustainable ways to use energy. Coal is not sustainable nor is oil. Watching the shipping and knowing the vulnerability of the River, I strongly support only safe, environmentally sound, uses including shipping, handling, and storing of safe energy sources. The risks are too great to the health of the River and the people who depend on her resources. Stop using our water ways, highways, and railways to transport dangerous materials.
Steven	Amick	stevenamick@hotmail.com	97004	OR	I use the Columbia River -- that is, the bridges over it -- to travel to your state for scenic travel, recreation, lodging, entertainment and shopping. if you allow this spectacularly stupid scheme to ship 360,000 barrels of greasy black gunk through the Columbia River Gorge, however, Washington will never see me -- or any of my money -- again.
Carole	Anderson	cwrdsmt@aol.com	97224	OR	
Van	Anderson	vanisaac@hotmail.com	98361	WA	
M.E.	Andre	andme@teleport.com	97202	OR	As an interpreter within the scenic beauties of the Columbia River Gorge, I have the opportunity to speak with people from all over the world who come to see the unique vegetation and geology in this stunningly beautiful area. When I ask folks about the river in their home area, they often turn to look at each other with quizzical looks on their face. River? We don't really have one, is a frequent reply. The Columbia is a treasure to steward! Oil does not belong in the Columbia, the habitat of spawning salmon and a wide variety of fish, birds, and wildlife. Please make sure the long trains bearing oil never enter the Gorge. Thank you.
Wren	Andrews	awaandrews@gmail.com	97041	OR	
Jon	Arakaki	Jon.Arakaki@oneonta.edu	13820	NY	
James	Arnold	james@ragbc.com	97217	OR	Dear Governor Insee, As a parent and business owner, I feel that this Tesoro Savage project is hasty and does not consider many long term negative economic effects. Environmental and health effects are ultimately economic effects too, and it's time that we stop putting off the responsibility of managing our resources. Our descendants need to be afforded the same opportunities that we have been afforded. Thank you for your consideration, James Ray Arnold
Jan	Aszman	janasz@gorge.net	98620	WA	
Sarah	Atkins	adanrowe@live.com	97031	OR	
Dale	Avery	dale.avery@comcast.net	99208	WA	
Emily	B	Embe34@gmail.com	97520	OR	Bad idea.
Roberta	Baeger-Cain	emilysing@aol.com	97202	OR	The Columbia River Gorge is a priceless natural treasure that my family and millions of others enjoy for recreation and renewal. We need to fully develop sustainable energy, protect our environment and fisheries, and have a refuge of unpolluted beauty for the health and inspiration of current and future generations.
Michael	Ballinger	ricgeromer@gorge.net	97058	OR	I live in The Dalles, OR and kayak the Columbia River regularly. Last October I paddled from The Dalles to Astoria and I hope you have the vision and integrity to withstand the economic and political pressure in order to do the right thing for the future of the river, the Gorge, and the people who live here. Thank you.
morrissey	barbara	taslin10@comcast.net	99210	WA	I benefit from the hydroelectric dams on the river, and imagine a spill could overwhelm their generators. Don't forget it is not easy for tankers to navigate the Bar from the Port of Vancouver.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Ellen	Barbour	ebarbour29@yahoo.com	98672	WA	Please Governor Inslee, always put our safety and future well being first. The planet is being polluted at an alarming rate. Clean water, air, and dirt are essential to our well being. Our most essential needs, food, air, and water are threatened by fossil fuel spills and waste. Thank you for your help
Bryce	Barker	couvduck60@gmail.com	98685	WA	I'm very much opposed to shipping oil on our rails and on the Columbia River. As a Washington citizen, I'm proud of our environmental beauty and feel that this oil terminal would be detrimental to our environmental quality.
Lou	Baste	kbaste7555@gmail.com	98683	WA	We enjoy the river its in part what we found that convinced us to settle here, now other states seem to want to befool ours with the stink of oil and the nearly continuous sound of never ending trains.
Philip	Baus	Philhynn@comcast.net	98664	WA	Now is the time to protect the citizens of Washington and it's environment. If we allow a terminal now, we can NEVER shut it down. Thank you for your time Phil Baus Vancouver, WA
Bridget	Bayer	bridgetbayer@me.com	97212	OR	I just want to swim the Columbia River again. Don't allow more pollution to get into the river by running trains so close to the only river in Oregon of it's size.
John & Tish April	Bayer Beasley	johnbayer10@yahoo.com beasleymichael55@live.com	98671 99217	WA WA	Acknowledging the evidence that coal dust deteriorates the rails and the railroads infrastructure has not been maintained and then adding more traffic seems absurd. I also don't want to contribute to climate change and environmental devastation allowing this tar sand oil through our state. It only takes 1 derailment of oil, coal or other toxins hauled by these trains to ruin our city and lose lives. I support unions but we need to think long term and commerce won't stop on trains. This is short sided bad economics. Lets move forward and start thinking about green sustainable energy and stop allowing oil, coal companies to kill the future for our children. We don't want this.
Michael	Beasley	beasleymichael55@msn.com	99217	WA	A real and carefully studied disaster response plan should be in place and considered before even thinking of approving this fiasco.
Ronald	Bedford	rbedford@cruzio.com	83864	ID	I live in Sandpoint, Idaho. These trains would pass through town, right along the Clark Fork river and Lake Pend Orielle, on their way to the Columbia. A single derailment along these waterways could have devastating impact to an already over-burdened ecosystem. The extra trains will also severely impact Sandpoint air quality, noise levels, and traffic congestion. We must say no to these oil trains, and to the additional coal trains that are also being considered.
Phyllis	Bekemeyer	phybek@gmail.com	97213	OR	The Pacific Northwest needs to hold its line against outside forces that would destroy our quality of life.
Carol	Bellows	lyricdancer@comcast.net	97224	OR	
Tom	Bender	tbender@nehalem1.net	97131	OR	
Ryan	Benson	r2bens@gmail.com	97211	OR	I use the Columbia river both as a recreational area, and as a fishery. I take all my out of state visitor to river to see the gorge, and the wildlife. Please don't open the river corridor to the transport of oil. The potential consequences far outweigh the rewards. Thank you for your continued protection of Oregon.
Rebecca	Bent	reclaimdemo@yahoo.com	97202	OR	
Lori	Benton	loribtn30@yahoo.com	97218	OR	
David	berger	davidberger169@hotmail.com	98635	WA	Please prevent this assault on our local environment and the resulting increase in global warming.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Ron	Bergman	ronb@pacifier.com	98660	WA	I am opposed to the oil terminal because of the potential impacts on the Columbia River of oil spill and related contamination especially related to the use of old style single walled tanker cars that the NTSB has determined to be inadequate for the shipment of highly volatile Bakken oil; the noise and air quality impacts on downtown and the public investments in the City's waterfront project, odors on the community; and finally the long term economic development potential for the community by relying on old style energy. The cost to the environment and impact on the community are simple not worth the limited additions to long term employment. If for some reason this project is approved conditions should include the use of double walled oil tankers; oil transfers to take place within a confined building with systems to capture leakage; provisions that oil is only for domestic use and refined oil and unrefined oil is not to be shipped out of the country.
Bella	Berily	mbwindbikeshopping@gmail.com	98672	WA	
J C	Bettencourt	jcacourt@yahoo.com	97302	OR	
Bill	Bigelow	bbpdx@aol.com	97211	OR	I don't live in Washington, but this directly affects us across the river. I heard you on Oregon Public Broadcasting today talking about Washington's need to stick to carbon-cutting goals. Coal and oil only make things worse.
Scott	Bishop	sbishop@oly-wa.us	98502	WA	
MARLES	BLACKBIRD	mblackbird@gmail.com	98501	WA	
April	Blankenship	letsgettosmetacos@gmail.com	83536	ID	
Doug	Boleyn	doug@cascaresolar.com	97086	OR	Dear Governor and the Site Evaluation Committee: The Pacific Northwest does not have any indigenous fossil fuel resources so have never been threatened with the destructive side effects of mining/drilling/shipping of such fuels. Until now. We value our pristine environment and our rivers. Especially the Columbia River, our major driver of commerce. The risk of oil spills from such trains is something we don't need here. And if we want to create jobs, there are many more jobs to be had in solar and wind generator shipping and installation than oil. I urge you to deny this additional threat to our River and our environment. No oil trains through our states. -- Doug Boleyn
Mary Ann	Bosky	marobosk@comcast.net	99223	WA	
Jan	Boule	jboule@aol.com	98683	WA	I am very concerned about air quality. I have respiratory issues and moved here from another state to have cleaner air to breathe. Please don't allow Tesoro Savage project to jeopardize my health and that of millions of others.
Hilary	Bradbury	hilary@bradbury-huang.net	97209	OR	The addition to oil is not easy to stop. But it must stop and soon.
Kyle	Brakensiek	kylebrak@gmail.com	97211	OR	
LARRY	BRANDT	hwlarry@yahoo.com	98612	WA	
Bradley	Branham	bradley.branham@gmail.com	98664	WA	submitted respectfully.
rv	brnham	gobq@yahoo.com	97211	OR	
Susan	Brantley	suebrantley@comcast.net	97211	OR	Way too much environmental impact.
Bobbi	Brice	bobbibrice@yahoo.com	97103	OR	In Astoria, we have the potential for LNG tankers and coal ships to be passing through our waters daily. Adding the Tesoro Savage oil ships will take the impact from terrible to unlivable. Please study the COMBINED environmental, health and safety, and economic impact these three types of ships will have on the communities along the river. Thank you in advance for considering the well-being of your constituents over the profits of big oil companies.
Ann	Bronson	bop@gorge.net	97031	OR	
Ann	Bronson	bop@gorge.net	97031	OR	
Alex	Brown	alex@bark-out.org	97202	OR	I hike in the Gorge and canoe in the Columbia. Adding safety and environmental risks to this area is a bad idea. Please reject it.
Diane	Brown	brown13da@gmail.com	99362	WA	The Columbia River is important for boating, fishing, waterskiing, windsurfing and many other activities. We need to protect our clean water sources in Washington state. The oil and coal industries and their shipping counterparts do not have a strong safety record nor do they seem to be able to come up with new strategies to clean up any messes that they make.
Richard	Brustori	oldtruckboy3@peoplepc.com	97214	OR	



First Name	Last Name	Email	Zip	State	Comment: Let Governor Hite and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Mark	Buchweitz	zonkersun@yahoo.com	97211	OR	I kayak and swim in the Columbia River, and I do not want to be surrounded by more pollutants in the water and air.
Carolyn	Buhl	carolynbuhl@gmail.com	97214	OR	I live just across the river in inner SE Portland. I deeply oppose oil trains carrying dirty Baakan oil through the Columbia Gorge, risking spills and assuring untold disruption in towns and cities along the train route.
Mischell	Burke	mischellbrk@gmail.com	97222	OR	
Helga	Burkhardt	muttskibu@gmail.com	98672	WA	A pipeline-on-wheels is not a good idea for our already fragile eco system. Increased risk of tanker spill would expedite climate change even further. Please Deny Tesoro Savage's application.
Jill	Burnette	jill@jillburnette.com	97031	OR	
Roberta	Cade	robertacade1@gmail.com	97304	OR	
Travis	Callender	tcallend31@yahoo.com	98028	WA	
Stephanie	Calvert	Stephaniecalvert@yahoo.com	97217	OR	This is the Columbia River we are talking about. Home to endangered salmon, and countless other wild species that cannot be threatened in case of a major spill, which seem to be happening with greater frequency. This is simply an unacceptable proposal.
Jane	Camero	janeoc@gorge.net	97031	OR	I live 5 blocks from the bank of the Columbia River and am daily on walking paths at the shoreline. In the summer I paddle the estuaries in a kayak. Please respect that increased railroad traffic will jeopardize our lifestyle and increase the risk of damage to the waterway and all life dependant upon it.
Elizabeth	Cameron	lizzy.bs@hotmail.com	99207	WA	Please don't take a chance...This is my home!
Laurie	Caplan	lcaplan2010@gmail.com	97103	OR	I look out on the Columbia River and WA from my dining room - what a precious treasure we have in the Northwest. Your legacy can be to further the revitalization of the Northwest through forward-looking sustainable economic development. Please say NO to Tesoro.
Barbara	Carey	barbmcoly@comcast.net	98501	WA	
Celice	Carlough	Mattandcelice@gmail.com	98632	WA	We live in Longview WA the Lower Columbia area has been our home for 50yrs. We are not opposed to good jobs but this is a dangerous area to get into. We believe in quality of life. The area we are from already has a high cancer rate and respiratory sufferers. I'm afraid of even more health issues pertaining to more crude oil and Coal. Not to mention the dangers of running so many trains on these tracks right through the middle of small towns and busy intersections. I ask you to please seriously consider the ultimate price that we will pay for a few good jobs. Sincerely Matt and Celice Carlough
Karen	Carpenter	kcarpenter2002@yahoo.com	99204	WA	
Carol and George	Carver-Ekum	river4mama@yahoo.com	98612	WA	
Karen	Caspers-Curl	kcdweld@wwest.net	98638	WA	
Janice	Castle	jancastle@comcast.net	97034	OR	
leon	chamberlain	leoncom@comcast.net	97051	OR	
John	Chao	sacredridge@gmail.com	97040	OR	
Heather	Chapin	Heatherchapin@comcast.net	97217	OR	
Leslie	Chartrand	leslie@liesliechartrand.com	98686	WA	As a Vancouver resident, I am concerned about the impact of the projected train traffic and potential oil spills. I also think we should keep our oil for our country's energy independence.
John	Christensen	NagarKot247@gmail.com	97019	OR	I am a resident of the Columbia River Gorge, and I have deep concerns about the transport of oil by rail through this precious landscape.
Larry	Christensen	lwchristensen@comcast.net	97210	OR	Please protect our precious rivers
Steven	Christian52	stevechristian52@gmail.com	97123	OR	
Susan	Christie	crypto716@gmail.com	97330	OR	
Cager	Clabaugh	cagerclabaugh@aol.com	98685	WA	My husband and I travel often through the Columbia Gorge by train (Amtrak). Please, no oil trains! And no more coal trains! The health of the Gorge and its communities is terribly at risk. It would take away land that we used to put wind energy imports on. It would also take land that could provide many jobs per acre, and clog them with oil tanks. I have seen many maritime accidents in my 20 years as a Longshoreman, and I feel that a serious accident with long term affects will happen if the oil terminal is built. Please stop this project and let's focus on projects that will create many long term jobs that won't jeopardize cargo movement on our River!

First Name	Last Name	Email	Zip	State	Comments: Let Governor Insee and ES&C know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
CURT	CLAY	curtclay@gmail.com	92192	CA	It would ruin windsurfing, boating, and degrade the viability of the environment.
Kimberly	Clifton	Kimberly.Clifton85@gmail.com	99202	WA	Doing this would be wrong on so many levels. The lives of residents and our beautiful "Near nature, Near perfect." communities should not be put at risk of an explosion/derailment. Our rails are already at capacity and adding more trains will only hurt us. Emergency services being stopped by a train and having to wait for it to go by could cause someone to lose their life. Even a high speed chase could end with the "bad guy" getting away because he was able to outrun the cops who got stuck on the other side of a train. (It happens in movies, I know, but this isn't physics breaking. It could happen. And probably has.) We need to stop looking to coal and oil anyway as both are running out. So let's not even have this be part of our State. We are the Evergreen State, so let's keep it forever green.
Nan	Clifton	nandmjones@msn.com	97211	OR	My husband hauled coal & other toxic materials for Union Pacific for 40 years and now has lung cancer -never smoked. My Norwegian family has always fished for salmon in the Columbia River, but with the toxins being disturbed with dredging, the river is getting more toxic. This is selfish - for profit of companies at the expense of people who live and breathe here. Let China find another source, disastrous and irreversible damage is too high a price for the benefit of a few deep pocketed companies. Please do not do this.
Meredith	Cocks	meredithcocks@gmail.com	97217	OR	It would be unconscionable for you to allow this project to be approved. The good news? You can make an honest decision and issue a finding of significant impact, and deny any and all applications that relate to this. Please do so, and be heroes for those of us hoping for a future.
Jon	Cole	lifepakguy@yahoo.com	98642	WA	As the impact of Global Climate Change become more apparent, we must take a leadership position in the world by promoting renewable, sustainable energy. We can't do this by becoming a mass exporter of fossil fuels. We must begin restoring the health of our planet.
Sarah	Collmer	scollmer@gmail.com	98660	WA	As a citizen of Vancouver, I am deeply disturbed at Tesoro's horrible track record when it comes to health and safety. The Anacortes accident, after so many warnings and violations, shows little regard for their workers' safety, to say nothing of the safety of local residents. Their most recent major oil spill in North Dakota and Tesoro's efforts to hide or minimize the facts point to their negligence and dishonesty. The bigwigs at Tesoro care only about their bottom line, and everything else may be damned. Don't let these profiteers trespass through our community and destroy our river, our air, and our health. Washington can do better, and we deserve better. Thank you for your time. Please make the right choice.
Mark	Colman	floldthebarber@yahoo.com	97214	OR	Our already severely polluted air and water will be moreso. NO to COAL!
Christine	Connolly	bcorn@gorge.net	98672	WA	
Philip	Conrad	kconrad@bahinbridge.net	98110	WA	
Michael	Cook	mikecook@nehalem1.net	97131	OR	
raya	cooper	rayaitenerose@gmail.com	48158	MI	
Solomon	cooper	solocoop@gmail.com	97005	OR	
Ann	Cordero	corderoa@teleport.com	98632	WA	
Cheryl	Costigan	HKbreries@aol.com	83869	ID	The climate crisis is real and the way we treat our planet is of vital interest to all. Although I am not a Washingtonian, what happens there if fossil fuels via oil trains are allowed to go through will also affect me here. Please deny Tesoro Savage's application. Please move us to a sustainable, green energy future. Thank you for your time and consideration.
Kathryn	Cotnoir	sandgrecnothoir@reachone.com	98520	WA	Dear Governor Insee: The safety AND environmental risks associated with this project are tremendous. Think of the recent rail accidents in Canada-July in Quebec and ten days ago in Alberta Oil by rail! Please deny Tesoro Savage's application. Please say no.
Katherine	Cotrell	kath@cotrell.net	97219	OR	This project adds up to yet another nail in the coffin for the earth and our children's future in the best of scenarios. In the worst, who will pay for the mess of a spill or explosion? Who will replace the dead fish and wildlife? Who will restore the wetlands? Please, please say no!
Barbara	Council	barbaraacnci@yahoo.com	97201	OR	Transporting and Using dirty oil is so wrong for the future of the West Coast. We need to build and fund structures that step away from use of fossil fuels. The time is now in order to have a better future for our children's children.

First Name	Last Name	Email	Zip	State	Comments: Let Governor Inslee and EPSCC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Terry	Courian	tcourian@yahoo.com	97223	OR	It's not worth risking an oil spill in the Columbia river. Please do not allow the terminal to be built in Vancouver (and elsewhere).
Jonnel	covault	jonnelcovault@gmail.com	97267	OR	The Columbia River Gorge should be a World Heritage Site not a transportation corridor for fossil fuels. If we put a price on carbon that included health costs from polluted air and water, climate disasters and degradation of the environment and infrastructure, these fossil fuel projects would not be profitable. We should be investing in Solar, Wind and green technologies. Germany, and other countries are way ahead of the United States in transitioning away from dirty fossil fuels. We MUST start thinking of future generations! Invest in GREEN energy solutions, please.
P.E.	Crawford	pcrawford@turbonet.com	98648	WA	
P.E.	Crawford	pcrawford@turbonet.com	98648	WA	
Dean	Cunningham	dean@dmcmetsmith.com	98663	WA	
Lyndee	Cunningham	lyndee@comcast.net	98675	WA	I walk the Columbia River trail daily and think it is one of the crowning jewels in SW Washington. Also, am out hiking the Gorge trails on both sides of river regularly. It's a pristine treasure for all lucky enough to live in this wonderful nature-rich area.
Nicholas	Curtright	Nicsmind@yahoo.com	98125	WA	
Nancy	Cushwa	tenwa@ps.net	97217	OR	
Carol & Clark	Custodio	ccustodi@msn.com	97520	OR	
Kristal	D	kristaldowell@hotmail.com	97058	OR	The business I work for is moving to Washington and we will be located extremely close to the rail road tracks. We work outside and besides the large increase in train traffic, there is a potential for deadly explosions to occur and since our business will be located so close to the tracks I am concerned now for my safety if the Tesoro Savage project is allowed. I also am fearful of the coal swept out of cars into the air as it is very windy along the Columbia River Gorge and I have breathing problems already this will only exacerbate my health problems. Windswept coal will also detrimentally affect endangered and protected species in the area. Coal and oil pills will have the potential of decimating populations of these species, as well as many others. Spills will also irreparably damage terrestrial and aquatic habitats, but the the National Scenic Area as well. Please don't be the one to go down in history as the Governor who killed the Columbia River.
Wanda	Daehlin	wmdaehlin@aol.com	99203	WA	
Michael	Dague	mpgadify@yahoo.com	99201	WA	
Karen	Damyanovich	karenrue@gorge.net	98672	WA	My husband and I retired to the Columbia Gorge so we could enjoy recreational activities on the Columbia River. The rail activity in the area is already heavy and we think this will have a huge negative impact on the environment and recreational attraction that makes the Gorge such a great treasure!
Chiara	D'Angelo-Patricio	chiara.r.dp@gmail.com	98225	WA	
Ingrid	Dankmeyer	ingdank@msn.com	98604	WA	
Jennifer	Darling	contrabandcuisine@frontier.com	97005	OR	Please make this a comprehensive review! I am a native Oregonian. I've always considered Washington and Oregon to be sister states. We share so much culture and environment- ocean, rivers, mountains, forests, farmland, etc. I'm also a native of this planet. In my lifetime our human capacity to tip the balance of ecological systems has grown tremendously. We must also increase our ethics to keep pace with our power. We're at a tipping point for the global environment. We're all on a sinking ship and should be talking about life rafts instead of how to accelerate on our old route.
Richard	Dauphin	richdauph@comcast.net	99223	WA	
Celia	Davis	cellaastoria@charter.net	97103	OR	
Judi	davis	davisjdi@comcast.net	97202	OR	Please stop the export of dirty oil. Thanks, Judi Davis
Karen	Davis	pisces3249@yahoo.com	97701	OR	
marilee	dea	marileedea@comcast.net	97218	OR	Don't put the gorge in jeopardy
Maureen	DeArmond	mdearmond@e-znet.com	98606	WA	
Lisa	Dekker	dekkerla@gmail.com	98125	WA	Recent oil-by-rail accidents show what a high risk exists for this proposal. Why would we jeopardize this waterway and all the communities that depend on it?

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Teresa	DeLorenzo	tde@teleport.com	97229	OR	Please make a decision to protect the Columbia River and make a positive change for addressing climate change.
Marcia	Denison	denisonmarcia@yahoo.com	97048	OR	Please deny the Tesoro Savage Pipeline Exporting oil will decrease our energy independence and raise the price to world market prices. What will we do when it runs out? The promise of oil spills and catastrophic train wrecks are imminent. Cleaning up the Columbia River is impossible. A spill into Gray's Harbor or Puget Sound would kill the marine life. Oil exports are a threat to national security and economic well being of the people. Please deny the application.
Ms. Karen	Deora	karendeora@gmail.com	97212	OR	Potential oil spills can impact our river and wildlife. Increased train traffic is dangerous to out health in many ways.
Ineke	Deruyter	ideruyter@hotmail.com	97203	OR	As someone who lived in the beautiful Columbia River Gorge area for more than 40 years, resided in Vancouver briefly, and a current resident of North Portland - just across the Columbia - I am adamantly opposed to Tesoro Savage's proposed project.
Christine	DeSmet	chrisrjd@hotmail.com	97217	OR	I live one mile south of the Columbia river. as a down winder I ask you not allow Tesoro- Savage to ship oil from Vancouver.
Bob	Devereux	poppiwithone@yahoo.com	97213	OR	We all share the same watershed and air, let's find a way to make money that doesn't compromise our health.
Mike	Diamond	bestfest@gmail.com	97214	OR	Thanks.
Tricia	Diaz	tricia@spicy-wasabi.com	98663	WA	I worry that this will impact the future livability of Downtown Vancouver. Please help to keep downtown a vibrant community by denying this project!
Diane	Dick	ddick@cmi.net	98632	WA	Please do not allow our rail corridors or the Columbia River become polluted fossil fuel highways for the sake of global commerce and profits. Protecting the environment begins in our own backyards.
Dante	DiTullio	danteditullio@yahoo.com	98661	WA	Vancouver already has riverfront development plans practically adjacent to crude oil facilities being considered. You can kiss those aforementioned plans goodbye if Tesoro Savage prevails. Please do right by the local planners and deny T-S their crude oil proposal.
Bill	D'Öller	bilde@mindspring.com	83864	ID	I'm an North Idaho resident- a state of mind if not an actual state. But I do recreate in the Gorge- and shop in Spokane and wine in Walla Walla. I also live beside Lake Pend Oreille in Idaho, crossed by the Burlington Northern just behind my mother in law's house. I'm writing you in hopes of a more impartial ear than I'm likely to get in Boise. These proposals are bad for the country and the globe long term, but short term potentially disastrous for those of us who live and play along the route. Thanks for your consideration.
Tammy	Domike	biblioho@gmail.com	98550	WA	Big Carbon is in a rush to complete these Coal/Crude By Rail Ports. They do not want these projects looked at for combined effects. They know the market is unstable & they want to make all the money they can as fast as they can & they don't care if they ruin our coast. Please deny all these permits!
Carl	Domihay	carldomihay194@gmail.com	97103	OR	
Nancy	Dooley	ndooley@idahococonservation.org	83864	ID	The risk of a derailment from a oil-laden train is too high to allow these trains to pass through pristine areas like the Columbia River Gorge National Scenic Area. We can not afford to have a repeat of a burst pipeline spilling oil into the Yellowstone or the oil train explosion in Quebec. Please say no to Tesoro Savage's application. Thank you.
Laurie	Dougherty	lauriedougherty@gmail.com	97301	OR	I live in Oregon and I cherish the Columbia Gorge for its beauty. The risk to the Gorge from this huge expansion of oil transport and shipping is too great. I have traveled across country by train several times and plan to do so again next month to visit my son in Boston, MA. Since the Bakken oil fields opened, rail traffic carrying oil along the BNSF northern route has increased dramatically and is frightening to see. The train wreck that caused an inferno and dozens of fatalities in Lac Megantic Quebec was carrying Bakken Shield oil. I am also very concerned about the climate change impacts of this huge increase in fossil fuel capacity. The Pacific Northwest is a leader in green technology and policy. Please let's keep it that way. There are alternatives to fossil fuels. Thank you.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Sarah	Dougherty	svanmater@yahoo.com	98006	WA	This project is a series of accidents waiting to happen. The livelihoods of those Washington and Oregon citizens living along its rail and shipping route will be impacted for the worse. Moreover, let's conserve our natural resources and keep North American energy in North America!
Patt	Doyle	patt@olympen.com	98622	WA	I live near Battle Ground and spend a lot of time in Vancouver. I would hate to see Vancouver become another LAC-MEGANTIC, Quebec.
Jonathan Pauline	Drechsler Druffel	badbassjd@hotmail.com pjdurufe@yahoo.com	96768 99204	HI WA	I use the Columbia River as inspiration. It thrills me every time I see it's majesty and beauty. It also carries (in barges) wheat grown on a farm of which I own 1/5 th. But I also would be impacted by the Tesoro rail/river project because I live very close to the train tracks in Spokane, specifically I can see the trains go over high bridge where it crosses Latah creek not far from where the creek goes into the Spokane River. I wasn't living here when a train derailed from that very bridge--fortunately there were no oil tankers or coal cars being pulled by the train at that time. I hate to imagine what might have happened if there had been. How awful to think of the possibility of some collision on the Columbia River or other accident which would cause the flow of oil into the river and then out into the Pacific ocean.
Peter	Dubois	Pete@recycleman.com	98604	WA	Please weigh the long term benefits vs the long term costs which include carbon equivalent emitted to the atmosphere. This is out opportunity to stand up to the old fossil fuel energy system and procla a new beginning. It needs to start somewhere and that could be Washington state under your watch. You can do it for us!
Joseph M. Richard	Dunford Durheim	joe.s.feeds@gmail.com rdurheim@charter.net	97220 97103	OR OR	I enjoy the scenery of the Columbia River Gorge; I don't want the Columbia River contaminated. I certainly do not want any upriver pollution. Astoria is downriver from all accidents that will happen.
Phillip	Durkee	pwdurkee@comcast.net	98661	WA	We know that a Oil and Coal terminals can be permitted in the Columbia River but should they? This is not the place, there is just too much potential risk to the environment and to the quality of life that we enjoy. All you have to see is the spill of oil in Prince William Sound in Alaska and the Gulf of Mexico which have destroyed jobs and a way of life, and those places have not been returned to where they were before the event.
Rebecca and Greg Heather	Durr Dury	becky@durrweb.com heather.dury@gmail.com	98520 97214	WA OR	Think about what we have to lose!
Carolyn	Eady	ceeady@charter.net	97103	OR	The hazards associated with this project are unacceptable. OAlso we will just be digging our planet into a deeper hole regarding climate change. Thank you
Ben	Earle	ben.earle@comcast.net	97211	OR	
Carolyn	Eckel	tiew4002@earthlink.net	97292	OR	
Mary	Eisenfeld	petermark3@comcast.net	98661	WA	The Columbia is a place of beauty, recreation and navigation. It does not need to be at risk from a needless project or for profit to trump environment and the beauty of the gorge.
Benton	Elliott	benton_elliott@gmail.com	97401	OR	You and our other leaders need to say No! to old fossil fuel thinking and instead create new public policy informed by current science. Thank you.
Carol	Ellis	carolielispokane@hotmail.com	99203	WA	My sons wind surf on the Columbia. I have picked fruit along the Columbia. My husband and I have swam in the Columbia. I have camped along the Columbia many times. PEOPLE USE THE COLUMBIA! NO OIL shipments or terminals.
Jan	Ellis	janellis@hotmail.com	98332	WA	We need to stop using fossil fuels now! We've caused the extinction of plenty of species and we're on the verge of self extinction!! On the bright side it may be the only thing that saves the rest of the planet!
Kay	Ellison	ellisonka@yahoo.com	98663	WA	We cannot risk the pollution in the future in order to burn oil now. If this is about jobs, there are better jobs for us to create. How about some clean energy jobs?

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and FESSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Tonya	Enger	enger@uw.edu	98664	WA	Mr. Inslee, My family and I live along the Columbia River in Vancouver right above the RR tracks. Nearly every day I cross those train tracks to walk my dog along the Columbia. There are several waterfront parks where the train tracks pass through. Further down is a county protected wetlands with walking trails that I also frequent. I cannot even fathom the possibility that barrels and tons of crude oil could be passing through this safe haven and my home and community. There is too much at stake. My life and countless others would literally be tarred forever if some worst case scenario would happen along our river. Not only would this endanger our unique and beautiful Columbia River Gorge, but it sends the wrong message about fossil fuel dependency. The power you wield in this matter can decide the legacy and preservation of one of the most beautiful parts of the country. Plain and simple, the risks is TOO HIGH. There is nothing to gain in the long term except corporate pension plans for Big oil barons. Finally, there has been an epidemic of corporate and state-level irresponsibility towards the risks of fossil fuel transportation with little or no accountability from the people responsible. Just these past weeks North Dakota saw their largest oil spill, and waited nearly TWO WEEKS before even alerting the public. Look at the Gulf coast and how the ecosystems and the livelihoods of the people that live there are ravaged and irreparably scarred. Not only did BP make the oil spill worse by pouring millions of gallons of poisonous chemical dispersants but now they are trying to get out of paying for their destruction. Similar trends are happening all over the USA. I cannot even think of what would happen if something like those events happened here in the beautiful Pacific Northwest. Please do the right thing. Thank you.
Pamela	Essley	pamess@gorge.net	98635	WA	Stop this, I want a clean colombia river. Erik
Erik	Estrem	estrem@gorge.net	98672	WA	This proposed transportation affects all of the Northwest region, indeed our country. As the saying goes, give them an inch, they'll take a mile! Please deny this application.
Wille	Estrin	mildonin@aol.com	97303	OR	
David	Evans	dave7819@yahoo.com	98662	WA	Global warming is here and it's real. We do not need carbon fuel, as there are abundant alternative energy sources available. Example: The report estimates that 200,000 exajoules of energy could be captured from EGS (enhanced geothermal systems) by 2050 in the US alone that's roughly 2,000 times the total consumption of the country in 2005. <a href="http://inhabitat.com/mit-study-shows-geothermal-could-produce-100000-megawatts-of-energy-in-the-us-within-50-years/">http://inhabitat.com/mit-study-shows-geothermal-could-produce-100000-megawatts-of-energy-in-the-us-within-50-years/</a>
Rowan	Everard	Wax.delerium@gmail.com	97217	OR	Would destroy my life style. Also the Columbia River and Vancouver WA. Will cause much pollution and damage to river.
Jim	Eversaul	sallineasy@yahoo.com	98668	WA	As part of the Columbia River community, oil barges and tankers on our river will have an adverse effect on the quality of the estuary.
Frans	Eykel	fransyke@yahoo.com	98612	WA	
Karen	Fairchild	karenfpub@centurylink.net	97041	OR	I live in a community with train tracks running through, along I-84, right on the Columbia River. I do not want increased traffic or air pollution in my community. I am deeply concerned about the potential for oil spills. Supporting oil in the age of climate change is stepping backward. Please think in terms of the quality of our shared future, and a healthy climate, not short-term profits. Thank you.
Megan	Farrell	Blumoonmeg@yahoo.com	97040	OR	
virginia	feldman	feldmanvi@gmail.com	97219	OR	I work in Vancouver & cross the river each time. But I breathe the same air even when I live in Oregon!
Alex	Fish	af.2112@yahoo.com	97217	OR	
Gloria	Fisher	gloriaf2001@hotmail.com	97220	OR	I frequently hike in the Columbia Gorge, both sides. I have been many places in the world and have found nothing like this. How could anyone even consider sending oil or coal trains through this beautiful area. Since the national government and chosen to name it a national scenic area, how could there be consideration of sending such dangerous pollutants through it as coal and oil? Just one accident could destroy it forever.
Jean	Fitzgerald	walktours2@aol.com	97219	OR	I canoe and kayak and often picnic on the shore...PLEASE...don't allow this tragedy to happen...!! The Gorge will be ruined forever!

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Sage	Florence	fsage@charter.net	97103	OR	Dear Gov. Inslee, I live in the community of Astoria at the mouth of the Columbia, which has many river-related interests. Please protect our river from potential oil spills and help keep America's fuel resources in America for Americans, by denying this project. Thank you for considering. Please do not approve Tesoro Savage's application.
Frances	Foley	ffoley@q.com	98664	WA	
Joyce	Foster	joycefost@aol.com	90024	CA	
Chris	Fox	wheresyourlobster@gmail.com	97103	OR	I spend most of my time on the Columbia as I live right on it's banks. The Tesoro project would basically destroy everything my family and I love about living in Oregon. If it came to pass we would move to another state or country as would MANY, MANY others that I know. This is a huge mistake and a horrible idea. Please do all that you can to protect Oregon from these corporate raiders. Thanks, Chris Fox
Merilee	Frets	merilee.frets@gmail.com	98683	WA	This morning's edition of Vancouver's Columbian newspaper featured yet another tanker train crude oil derailling and explosion this time in Alabama. If such an incident happened in Spokane or Sandpoint (ID) or the Columbia Gorge or Vancouver, the consequences would be beyond devastating. Please, please deny the permit to site an oil storage facility in Vancouver. It is short-sighted and far too dangerous to allow. Merilee Frets Vancouver, WA
Cindy	Frye	ckfrye-art@comcast.net	98686	WA	
Victoria	Fuller	idahoflying@yahoo.com	83860	ID	The rail route passes through our town close to soccer fields, schools and homes. It winds around the shores of our lake and the Pend Oreille river which is part of the Columbia watershed. Even the remote possibility of a derailment should be enough to make you question this project. And the fuel isn't even needed or intended for our country. How long will money rule and how long will our "leaders" let our country continue to become a sacrifice zone to shortsighted greed?
Kayla	Gallentine	K.gallentine@hotmail.com	97031	OR	Our precious Columbia River has provided much of our PNW history. Without it, we wouldn't have been able to produce such a lively fishing and logging industry. Why do we need to take a step towards unsustainable energies when we have so much potential with wind, solar, geothermal, and wave power here in the PNW? This is an inappropriate step with money making being put before the wishes of the people. Are you here to serve the people or giant corporations who care nothing about an individual's right to life giving necessities like clean fresh water, non-toxic shelter and foods, and not having the potential of serious disaster looming over peoples heads. We the people love living here, please don't ruin it for everyone but the top money makers....
Mary	Galloway	maggiegalloway@mac.com	97232	OR	I moved to Oregon about a year ago from Minnesota, the land of the lakes. The reason I chose this area is because of the gorgeous nature that surrounds us, and the amazing rivers. Water is a very important part of my life, and the life source for everything on this planet. If we ruin our water, we ruin all life. Please don't let this happen!!
R	Gamboa	rl_gamboa@hotmail.com	98102	WA	Please consider supporting alternatives to oil and the very real risks this proposal involves and reject this proposal to keep our state as eco-friendly as possible and set an example for the rest of the nation.
Lara	Gardner	Lara_Gardner@me.com	97217	OR	
Linda	Garland	lfg2014@gmail.com	97138	OR	
Marc	Gauthier	blackriverpro@hotmail.com	99026	WA	Dear Governor Inslee, We nominated you for reasons just like this. As our elected leader I expect you to ensure the safety of our communities and our children. This proposal has the potential to seriously jeopardize both. This world is desperate for leaders who are willing to do what it takes to get us back on a sustainable path and these are the moments that define those leaders. With Respect, Marc Gauthier
Carol	Gearin	gearin80@msn.com	97146	OR	
Linda	Geiser	lgeiser2003@yahoo.com	97330	OR	We already have enough CO2 in the air to do great harm. Now is the time to reduce emissions not add to them!
Eric	Geisler	eageisler@yahoo.com	97124	OR	
Will	George	h2ohiker@yahoo.com	97103	OR	
Susan	Gere	Susangere@gmail.com	97203	OR	I don't want to see the Columbia become another Gulf - which I don't expect to recover in my lifetime.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Sudeshna	Ghosh	itsmedew@mailbox@rediffmail.com	700023	ot	
Jim	Gilbert	jgilbert@oregonsbest.com	97038	OR	
Carol	Gilden	cag9558@gmail.co	97223	OR	what makes the Northwest so beautiful is our environment....I lived in Texas when BP had it's oil spill and I have seen what one accident can cause. I am here to say it is not worth it. Keep our rivers clean and safe for all....people, animals, fish.....all it takes is one accident.
Bob	Gillespie	rgillesp@live.com	98801	WA	
Wendy	Gilmore	terrvin@clear.net	97006	OR	
Susana	Gladwin	susana.gladwin@yahoo.com	97138	OR	What a terrible project. All the possible risks so large corporation make lots of \$\$\$\$ on a really dirty product that makes global warming increases inevitable.
Lauren	Goldberg	lauren@columbiariverkeeper.org	97031	OR	
Sunny	Golden	sunnygolden@me.com	98660	WA	
d	goldsmith	dell.goldsmith@gmail.com	97225	OR	Please help us protect ourselves and our beautiful region from this destructive project. I love to hike in this area and as a former biologist I am aware of the intricate and fragile nature of most ecosystems due to human impact and climate change. We cannot take our environment for granted.
Adrienne	Gonzalez	adrienneg@gorge.net	98672	WA	I live in White Salmon/Bingen, Wa., one of the little towns along the rail and shipping route to Vancouver. I am horrified at the possibility of oil trains passing through my community. When I hear on the news about the latest derailment and accompanying death and destruction that seems to plague these trains, I know that that could happen here. Please don't let it! I urge you to deny Tesoro Savage's attempt to profit at the expense of the citizens of Washington state.
James	Goodwin	goodwinlandscape@hotmail.com	97412	OR	As a kite surfer, I believe the noise and emissions impact would be negatively significant to my experience as well as others. I would support a rigid pipeline instead of rail transport. Thank-you. Jim Goodwin
Leonard	Gordon	gordon6@comcast.net	98665	WA	
Tony/Diana	Gordon	trngardens@comcast.net	98671	WA	Gentlemen: We feel that this project will have an adverse effect on Washougal. We have 5 at-grade crossings and only one overpass. If this proposal and the 2 coal terminal proposals go through, we will have an increase of more than 35 trains daily. Getting to the downtown area will be difficult and time-consuming. Our town will effectively be cut in half. I think also that such an increase in shipments of dangerous commodities like oil will depress our real estate values and discourage new businesses from locating in our area. There is nothing in this proposal for our community and it will provide few new permanent jobs even in Vancouver. It will be costly and dangerous for us. Please do not allow this project to go forward.
Alan	Granat	alan@therocksociety.com	98671	WA	My family and I use the river and nearby areas extensively for recreation: fishing, boating, hiking, etc. Please don't sell out to the dangers this project would bring to this wonderful region.
Mark	Gray	crgnus42@aol.com	98502	WA	Lots of risk, little return on this!
John	Green	jgreen2317@aol.com	98632	WA	Too much danger to citizens and the Columbia river
Lowell	Greenberg	llg@earthrenewal.org	97229	OR	
Bill	Griesar	bgriesar@gmail.com	97211	OR	Please DO NOT allow oil by rail along the Columbia River - it is too dangerous and there have been too many accidents that have caused terrible damage and loss of life.
Jonathan	Grimm	jhgri@ymt@yahoo.com	83864	ID	Please, for the children, don't let this expansion project go on!
Jim	Groat	jhgdesigns@yahoo.com	97220	OR	Do not let Tesoro pollute Washington and Oregon.
Andrew	Grossman	andrew_grossman@hotmail.com	98648	WA	I live in Stevenson about 3 blocks above the Columbia River, where I swim almost daily mid-late summer. I worked with USFWS on Exxon Valdez oil spill in 1989. It will never be cleaned up. We should not do that here. It should never happen again. Our wealth is our fisheries, wildlife, and clean water.
Zoltan	Grossman	zoltangrossman@gmail.com	98502	WA	Safety is my primary issue. Oil trains coming from the Bakken oil shale basin in North Dakota are carrying a more volatile crude oil, the same type that exploded and killed 47 people in Quebec. I'm also concerned about a tanker spill that affects our fishery and shellfish beaches. Simply having a more robust clean-up plan misses the point--the only way to prevent a spill is not to bring in huge amounts of new oil.



First Name	Last Name	Email	Zip	State	Comment: Let Governor Inlee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Todd	Guren	tguren@hotmail.com	97034	OR	As an Oregonian who is registered to vote and votes in every election, I urge you to deny the application. I moved out to the Pacific NW 11 years ago for the environment and want to see it preserved for my sons and future generations. We only have one opportunity to preserve the Columbia Gorge.
Todd	Guren	toddguren@gmail.com	97034	OR	
Gwen	Hadland	Mousery@comcast.net	97123	OR	
Lindell	Haggin	lindell4118@comcast.net	99208	WA	Spokane would have significant negative impacts from increased rail traffic both from emissions and delays at multiple rail crossings.
Lorrie	Haight	lorriehaight@yahoo.com	98651	WA	It is important to save the Columbia River from becoming a super highway for fossil fuels. The whole world needs to get off fossil fuel energy. These huge companies need to start putting their money into alternative energies like wind, solar, geothermal, tidal, etc. Everyone is affected by climate change and we can turn this around if we stop feeding the greedy companies who are only interested in the profit.
Eidon	Haines	rain.cat@comcast.net	97218	OR	Selling our abundant coal and oil in Asian markets will certainly produce great profits for the producers, transporters, and shippers, and a few jobs. It also assures that the coal and oil will be burned, further burdening our atmosphere with more greenhouse gas. Let's focus instead on resources that create many more jobs and protect the Earth for our children and grandchildren.
Emily	Hajarizadeh	e.hajarizadeh@gmail.com	97214	OR	Oil in the Gorge??? You can't even build a woodshed in the Columbia Gorge National Scenic area...why risk an oil spill and pollution on a gigantic scale? Please deny the proposal!
Patrick	Haley	path@gorge.net	98672	WA	Clean air, clear water and our lands. Are you kidding me. Keep this out. We don't want it.
Julianne	Hall	finnsrull@gmail.com	97138	OR	
Marguerite	Hall	margueritehall@gmail.com	97210	OR	This proposal effects life as we know it. One spill means an ecological disaster that we might not be able to recover from. I am opposed to exporting fossil fuels for profit. This is a boom bust cycle and when the bust happens the environment will be devastated here in the source region. How can you even consider barging highly toxic coal, oil, LNG down our rivers and across the ocean, when the oceans are experiencing huge die-offs and climate change exacerbated by the prevalence of fossil fuels is responsible for the climate change disaster in the Philippines. 10,000 humans is a huge die off!
Sherry	Hall	Sherry@spiritone.com	97202	OR	
katrina	hampton	scotrina@msn.com	98663	WA	Some of the reasons why people come here is to enjoy the beauty and the many outdoor opportunities. Once that is gone, it can never come back. People are looking to you, as our governor, to stop corporations from destroying our environment. We are trusting you to do the right thing.
Tarika	Hanawalt	tarikahanawalt@yahoo.com	97202	OR	I boat and fish in the Columbia River and hike the Columbia River Gorge year round. A spill from an oil tanker in this lower area would be devastating to say the least.
Bourtai	Hargrove	Bourtai31@gmail.com	98512	WA	
Kim	Harless	mamakik87@gmail.com	98661	WA	Vancouver is my home, and the Earth is everyone's home. Not only does this affect me directly I believe we all should do what we can to protect life on this world and not exacerbate climate change.
dick	harmon	dikwisingup@hevanet.com	97202	OR	I have grandchildren and great-grandchildren in Washington and Oregon. Read McKibben's math and his sources: 14 years or so before the feedback loops go nuts. How old will each of your children be in 14 years? THAT's what's at stake in Tesoro's part of the fossil fuel takeover of the Northwest.
Nicole	Harrington	nmolenaar@yahoo.com	97068	OR	
Andy	Harris	andyharrismd@comcast.net	97201	OR	
Beth	Hartwell	beth@gorge.net	97051	OR	
michael	harves	mtharves@gmail.com	99201	WA	I fish the Columbia River and it's tributaries and need that water to remain as clean as possible. Neither increased oil or coal shipments are going to help.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage Project would affect you.
Sierra	Hawksley	sierra.hawksley@gmail.com	98606	WA	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage Project would affect you. c/o efsec@utc.wa.gov RE: Deny the Proposed Tesoro Savage Pipeline-on-Wheels Project Dear Governor Inslee, Mr. Posner, and Washington EFSEC, I urge you to assess the full impact of Tesoro Savage's proposal to ship 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's unprecedented proposal. The public safety and environmental impacts of the state's largest pipeline-on-wheels proposal deserve close scrutiny. For example, EFSEC must assess: The potential impacts of a large train-related oil spill along the rail route in Washington and beyond. The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route. The increased risk of an oil tanker spill on Washington State waters and along the shipping route. The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave. After carefully considering the safety, environmental, and climate risks associated with the project, I respectfully ask you to deny Tesoro Savage's application.
Steven	Hawley	sjhawley@mac.com	97031	OR	I live in the Columbia River Gorge. Turning these already busy rail lines into de facto oil pipelines is not in the best interest of the region. I urge you to deny Tesoro's application.
William	Haywood	haywoodwh@mac.com	98531	WA	We elected you to protect our backs, not stab us in the back with another filthy oil/coal monstrosity. Tell the people, right now, that you have our backs! I dare you!
Willis	Heavenrich	nednlulu@yahoo.com	97103	OR	Please stop this crazy project.
Bruce	Hecht	brucehe@peak.org	97333	OR	
Zachariah	Hack	zheck24@gmail.com	97526	OR	
Bev	Hedin	bevhdin@comcast.net	97201	OR	
Brian	Henning	briang.henning@gmail.com	99025	WA	
Marian	Hennings	cashme327@comcast.net	99207	WA	I live in Spokane and the increased rail traffic would adversely affect other nonrail traffic in the city and Spokane County. I am also very concerned about derailment because the rail line runs through downtown and above I-90. The rail cars being used to ship the oil are not adequate for the loads they are carrying, making spills more likely. There was an expose about this in the Chicago Sunday paper week before last. We do not need a derailment with attendant explosion in downtown Spokane.
Joseph	Herb	joherb@gmail.com	98110	WA	
Erick	Heroux	heroux@efn.org	97202	OR	
Pat	Herrington	patportland@yahoo.com	97202	OR	
Craig	Heverly	heverlyc@jps.com	97206	OR	
Hollis	Higgins	treebarkhh@yahoo.com	99205	WA	
Derrick	Hindry	dhindery@uoregon.edu	97405	OR	
Betty	Hittler	behtitt@gmail.com	98671	WA	Please protect Washington for future generations.
Stan	Hoffman	stanhoffman@mindspring.com	97212	OR	
James	Hoffmann	hopvillefarms@gmail.com	97016	OR	
suzi	hokanson	suzihokanson@yahoo.com	99208	WA	It was great to have you come to SCC, THANKS
Mary	Holder	mrutholder@gmail.com	98274	WA	
Vicki	Holman	vholman@hotmail.com	98685	WA	I am also concerned about which agencies will pay to up grade train crossing to allow for traffic to pass that would be bogged down by these trains.
Jenny	Holmes	jehrestore@gmail.com	97213	OR	I care about the health of the waters of the Northwest which are our lifeblood. Putting our waters at risk through oil pipelines on wheels is irresponsible. You are supporting the desecration of God's creation by enabling the movement of dirty oil through our region. The climate impacts of this project must be considered.
Nancy	Holmes	nholmes105@yahoo.com	97138	OR	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Thomas	Holz	tomholz@comcast.net	98502	WA	The Columbia is a national treasure. Please oppose the pipeline which puts the river and community at risk.
Tony	Howard	Microtribe@gmail.com	97203	OR	
Jared	Howe	Jaredchowe@gmail.com	98108	WA	Dear Governor Inslee, As a long time Vancouver resident, graduate of Washington State University Vancouver, with every intention of building a future and my new family's life in this city, I am highly concerned about the oil transport project proposed by Tesoro Savage, as well as the Port of Vancouver's vote to support it. Within the past 10 years Vancouver's quality-of-life has improved by leaps and bounds. The local economy has improved, downtown is now a beautiful and entertaining place to go when before it was a run-down ghost town, and organizations aimed at improving the quality of our environment have popped up. The proposed project threatens all of this progress we've seen and built. It threatens to pollute our air, water and soil quality, increase noise pollution, and our safety. While Tesoro Savage can claim all the safety and environmental standards will be met, time and again we are reminded that these promises more often fail than succeed. I am not willing to take that risk, and would have no choice but to consider relocating out of Vancouver, and I'm certain many others feel the same. Please do not impose this risk upon the citizens of Vancouver. Many of them will only hear what the industry wants them to hear; will only focus on the words "economic progress", without really understanding the implications this project could have on the lives of their families, community, as well as Vancouver's future generations. Thank you, Mary Hoxer
Mary	Hoxer	mary.hoxer@email.wsu.edu	98661	WA	
Vernon	Huffman	vernonhuffman@yahoo.com	97330	OR	James Hansen says burning this oil is "game over for the climate."
K. A.	hughes	karmen.hughes@gmail.com	97103	OR	I live at the mouth of the once mighty Columbia river in historic astoria, oregon and I feel this would be a horrible mistake for the remaining wildlife within our region and for the humans living in this region! let's get more advanced in our energy thinking and not let corporations with capital to burn sway our elected officials down a path of horrible, horrible mistakes!
Susi	Hulbert	susi1313@yahoo.com	98632	WA	PLEASE Reject Tesoro Savage's dirty oil project. We can do better. Let's create clean jobs for the future. Thank you
Kathleen	Hulick	kaweaha50@gmail.com	98606	WA	
Stephen	Hulick	Kaweah50@gmail.com	98606	WA	We sightsee, hike and boat along the Columbia River. We do not want the environmental quality of this wonderful area destroyed by this insane proposal. Non stop 100 car trains bringing highly corrosive, highly explosive oil along a route over 1,000 miles long. A terminal transferring the oil to tankers polluting Vancouver. Both trains and terminal vulnerable to attack and accident with disastrous results. Supertankers in Columbia River? Again, this is insanity! We need to develop renewables instead of contributing greatly to climate change through increased use of fossil fuels. Getting oil by fracking is not the answer! You must deny this proposal! Thank you.
Kimberly	humann	khumann@gorge.net	97031	OR	I live, work, and play in and on the banks of the Columbia River. The noise and the low air quality concerns me deeply as a mother, an individual, and a physician. I care for patients, many of whom live near the train tracks on the Washington side, and would be directly affected. A number of my favorite rock climbing spots and wineries are near the tracks on the Washington side, therefore I frequently spend time and money in the state of Washington. The soils where many of the best wine grapes in the country are grown will be affected, and there is a substantial safety issue for climbers, who need to hear each other. We already wait for trains to go by before we attempt riskier pitches, but incessant traffic will be a major issue.
Autumn	Isenagle	bemysescape@hotmail.com	97405	OR	Tesoro just destroyed a farmers wheat crop in North Dakota with an oil spill 7 football long and tired to hide it! They are irresponsible!
Camille	Jackson	camjackson1@comcast.net	97005	OR	
Jeff	Jackson	jjackson158@msn.com	97470	OR	I hike along the Gorge and enjoy the fresh, clean air. Please don't pollute it with the tesoro Savage project. Thank you, Jenika
Sharon	Jenika	jenika5525@comcast.net	97215	OR	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Dallas	Jenkins	dallas.jenkins@pcc.edu	98663	WA	The Columbia River belongs to all of us not just a few individuals with private interests. This is our home, our space and we want to keep our local environment free from abuse and misuse. Damaging our local environment just so others can turn a profit is unforgivable. We export most of the resources we abuse our earth for in the first place and the risks far outweigh the proposed benefits. We need to stop now before we have gone too far.
Dawn	Jenkins	stacyjenkins@hotmail.com	83864	ID	We are already struggling to protect, improve quality, and health of our lake and waterways. Please do not allow this disaster waiting to happen to become a reality. Thank you
Howard	Jennings	triplennings1@gmail.com	97217	OR	If we don't get to solar soon, we've written off our grandchildren!
diane	jette	djette@gmail.com	97138	OR	Please kill this project. It's very very bad for the people of Vancouver.
James	Johnson	jb@easystret.net	98661	WA	We live at the mouth of the Columbia River and what happens upriver affects us and the environment. Please reject the reject "Tesoro Savage's dirty oil project". Reject the proposal to transport 360,000 barrels of crude oil along the Columbia River by rail and then ships. This would involve at least four, mile-and-a-half long trains every day. We're talking about 42% of capacity of the controversial Keystone XL project. Reject oil trains that would pass through downtown Spokane, the Columbia River Gorge National Scenic Area, the City of Vancouver, and other cities on the Burlington Northern Santa Fe rail line. Please deny this project, so big that you will make the final decision to approve or deny the terminal. Thank you for your consideration, LaRee Johnson
LaRee	Johnson	ladles-accessories@yahoo.com	97103	OR	
Mary Lou	Johnson	Johnson-ml@comcast.net	99224	WA	Four more diesel trains will negatively impact my breathing and health. I already have asthma and don't need explosive to carcinogens. I am also concerned that any leakage or accident could ruin our local rivers and water supply.
Shannon	Johnson	thesha.na.na@gmail.com	97217	OR	We need to move on from developing infrastructure to support a deadly energy source. From the environmental damage done at the extraction sites, to the energy spent furthering the climate crisis, this project is unworthy of your support. I want all of the potential impacts of this project considered, and I hope it leads us to question the investment in harmful and shortsighted resources while we could be developing energy infrastructures and businesses in the Northwest that will actually benefit further generations.
Cynthia	Jones	Xxx@xxx.com	07301	OR	
Emilia	Jones	mj.emilia@gmail.com	98103	WA	
Amber	Joplin	amberbsk@gmail.com	99205	WA	Please let's work for clean energy at home and away! The Columbia and Spokane Rivers are irreplaceable!
Jeffrey	Juel	jeffjuel@wildrockies.org	99204	WA	
Ruth	Kaser	Mom.skaser@gmail.com	97470	OR	The Columbia is a national treasure and deserves passionate protection. Our planet deserves the same. Investment in carbon resources are problematic. This project is particularly so.
Lisa	Kasper	lisakasper@gmail.com	98445	WA	When will the oil madness end? all of this money needs to be put into renewable energy sources. How many salmon ever died from a windmill power generator? ZERO.
Michal	Kawka	fiszka11@gmail.com	97058	OR	
Dr. S.	Keely	Skeely.2013@gmail.com	98625	WA	Save our earth by stopping all fossil fuel production and switching to renewable sources of energy NOW. Our children deserve clean air, water, land, and food.
Hank	Keeton, Ph.D.	HKeeton@KeetonCorp.com	97375	OR	Polluting the environment...polluting our lives...this madness MUST END!
Ginger	Kelsh	gkelsh@comcast.net	99223	WA	
cecilia	kessel	humancul@comcas.net	98663	WA	
Dr Barbara	Ketcham	ketchams4@comcast.net	98661	WA	My family and myself enjoy the Columbia Gorge and it's beauty immensely. it's incredibly short-sighted to jeopardize this area to submit to perceived needs for coal. Find another alternative fuel or conserve!
Lauren	Kim	laurenlovestrees@gmail.com	98102	WA	My family lives in North Bonneville and Vancouver, WA, both cities next to the Columbia River. The health of the Columbia is important for the health of people and the environment as well as the economy. There is no such thing as a spill-proof oil operation and an oil spill would be devastating to this area. Please do not approve this Tesoro project.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Jayne	King	jaymek311@aol.com	98632	WA	Please protect our beautiful river, the habitat and fish. Please, please do not let Oil get near this wonderful waterway.
Jeff	kipliman	jkip@comcast.net	97212	OR	
Marjorie	Kircher	marmitch@comcast.net	97205	OR	Gov. Inslee and EFSEC: I am quite concerned about transporting oil by rail through our communities. There is great risk from diesel pollution (carcinogenic, asthma triggering, and new research from NIH reveals association of diesel with neurodevelopmental effects such as autism in children), but also risks of derailment, explosive fire and oil spills could devastate our communities and environment, like what happened recently in Quebec and Alabama.
Dave	Kisor	panther_dave@yahoo.com	96778	HI	I am also deeply concerned about the impact the increased volume of train traffic, which goes through the center of our city, would have on our community, especially in terms of emergency access to the city, noise from the whistles at the RR crossing and potential environmental damage should a train derail or leakage occur. We are located on the shores of Lake Pend Oreille and the pristine beauty and water recreation are the lifeblood of our economy and quality of life.
Eileen	Klatt	eileenklatt@klattfish.net	83836	ID	Please fight to keep our river clean.
Craig	Kleiv	Calkekob@hotmail.com	97202	OR	I have lived on the Columbia in Washington and in Oregon for over 60 years. This river is a treasure that we must not squander for greed over mining dirty coal. I urge you to consider future generations as you make this decision. The Columbia River Gorge should be here as far in the future as it has been in the past, for all people and for the salmon to inhabit in good health.
Kristan	Knapp	musica@spiritone.com	97215	OR	
Dianne	Koer	diannekmx@gmail.com	98606	WA	The Columbia Gorge is a national scenic area, a region to be embraced and protected, as it has been from windmill development. The river itself is a source of water, power and food. None of these is a minor commodity. We do not need to risk any of these for the promise of a handful of jobs and some revenue that may will be consumed in mitigating problems created by a fossil fuel corridor. Please use your authority in a way that will benefit the many over corporate profits for the few. As an aside, I own stock in Berkshire and still believe this is a horrible idea.
Sybil	Kohl	sybkohl@msn.com	98606	WA	The proposed terminal would damage the ecological system of the Columbia River and worsen conditions for recreation and wildlife, reduce clean water and air quality and increase global warming.
Andrea	Kopecy	andrea.k123@gmail.com	94610	CA	
Meryle A.	Korn	meryle.korn@gmail.com	97218	OR	Just as coal trains through the Columbia River Gorge would have a severe negative impact on this national treasure both in Oregon and Washington, so also would the Tesoro Savage project endanger the environment and lives of citizens on both sides of the Columbia. Please deny the proposed Tesoro Savage "Pipeline on Wheels" for the protection of both our states.
Heather	Kowalewski	heatherkow@gmail.com	98672	WA	
Emily	Krafft	emily.krafft@gmail.com	97211	OR	Dear Governor Inslee, Thank you for your leadership on climate issues, including your recent work on the Pacific Coast Action Plan on Climate and Energy. I encourage you to continue to take a strong stance on climate action, and deny dangerous projects such as the Tesoro Savage that pose a great risk to our public safety as well as the livability of our world.
Christopher	Kralik	misterkite@comcast.net	98607	WA	Not only would there be local environmental impacts, have you noticed the increase of devastation from climate changes due to global warming? Ex: Hurricane Sandy, Typhoon Hyan and the recent tornado outbreak in the middle US. Please reject oil and coal exporting in the Northwest! Thank you!
Bette Lu	Krause	Bettelkrause@gmail.com	98740	WA	
Marilyn	Krause	ruddak@comcast.net	97215	OR	Our Columbia River Gorge is so important to all in Oregon and Washington. There is no way to guarantee an accident would happen. Imagine the destruction if this happens. Please carefully think this from all sides. Thank you. mk
Dr. Harold	Kriesel	c1ricket@yahoo.com	98612	WA	I live on the river. Can you imagine this amount of oil going past my front door every day? Please don't let them build that pipeline! Dr. Kriesel

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tsesoro Savage project would affect you.
Eric	Kuhner	seekqr@hotmail.com	98110	WA	The risk of a spill on either rail or ship is too great, especially given that the oil is not needed domestically and only contributes further to CO2 production. The costs fall on the residents of Washington state while the oil is neither produced or consumed in the state or the country and most of the profits and benefits will be felt elsewhere.
Linda	Kulm	lk.kulm@gmail.com	98685	WA	I am a nurse, mother, and grandmother. I believe the potential for an environmental nightmare far outweighs any job growth. We can do better for our port and for our grandchildren.
William Edward	La Rue	william.larue115@pcc.edu	97266	OR	
Marilyn	Landeros	edlaclergue@comcast.net	98501	WA	
		wilowone618@msn.com	97217	OR	Please keep our river safe and clean. In the long run, shipping Oil across the Columbia by train or ship will not put that many people to work or supply that much more fuel but could very well be a toxic disaster.
Kathy	Lane	ladylane99@hotmail.com	98663	WA	I live in downtown Vancouver and I do not want it to be another Lac-Megantic here. The costs to our local economy and the potential for devastating accidents are too great. The waterfront project in downtown would bring over a billion dollars in revenue to Vancouver versus the proposed 100 million that oil would bring and they are not compatible projects. Already backers of the waterfront project are threatening to pull their funding because of the mega oil terminal. Say no to this horribly irresponsible oil terminal.
Tatiana Judith	Lane	tatiana.lane@hotmail.com	98112	WA	
	Langhans	suelanghans@gmail.com	98502	WA	Wow, what a mess in case of an accident. We know that these companies are not the least prepared for making it right for mother earth or people and their livelihoods when accidents occur and they do often.
Mary James	Langley	melangley@hotmail.com	97103	OR	Please don't sell the Northwest down the river.
	Lanz	james.lanz7@gmail.com	98660	WA	I walk, hike & bike along the Columbia River regularly. I am concerned about the potential impacts of a large train-related oil spill along the river. In addition, since I live just a few miles east of the proposed terminal, I'm concerned about the personal health effects to me, my family & community residents from the air pollution resulting from transferring the oil first from trains to tanks, then from tanks to ships at the proposed terminal.
John Patricia	Lapham Larsen	blackdogwoods@gmail.com	97470	OR	
		pkaasiarsen@yahoo.com	97103	OR	Our family fishes the Columbia and surrounding rivers. Please help us keep them clean and protect our environment.
Mira M. G.	Latoszek Laubach	mira.latoszek@gmail.com	98144	WA	
		matt@efn.org	97405	OR	Extracting this dirty oil from the ground and burning it is game over for the environment. I say "no" to the terminal, and the risky transport by rail.
Jaydon Frederique Roland	lavalla Lavios	lavalla21@gmail.com	98664	WA	
	Lavoie	frederique@pbwwebsitedesign.com	97034	OR	
		lavoierp@msn.com	97031	OR	Nature and all its resources including fossil fuels will never be cheaper than they are now or put another way, why sell our environment today when it is increasing in value every day much faster than is the world's inflation index. We would sell what is most valuable for a relatively few jobs and a modest increase in tax base. It is akin to eating ourselves - in my view. There is now and there is tomorrow. I submit we need to shift our decisions to weigh tomorrow over today.
CHRISTINE Edward	LAWTON Lee	gordini_2@comcast.net	98665	WA	No oil terminal in our city, no oil trains in our Gorge, please!!!
		edlee69@hotmail.com	97005	OR	Please do not threaten the lifeline of Cascadia with this outdated energy project! Do not allow the Columbia River to be threatened by crude oil. Too much economic cost is involved to risk even one spill along the river.
Jeannie	Leeper	leeperje@leeperpdx.net	97201	OR	The Columbia River is a vital natural resource. Coal is not appropriate exposure for this important and delicate river. Jeannie Leeper
Heather	lehman	lehman.heather@gmail.com	98660	WA	I operate and work with food and fisher families across Washington and our coasts. I am also a clean air advocate because my area is already impacted by air quality issues from the I5 corridor. I fish and hike and promote tourism along the gorge, and I find this proposal to be egregious in the context of the whole planet.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Geary	Lewis	facebook@wegowireless.com	99201	WA	Please reject Tesoro Savage's dirty oil project. We use our river to swim, hike around, run along and boat. No dirty fossil fuel projects.
Alicia	Liang	lliangt@gmail.com	97214	OR	
Steven	Liedlich	stevenrayliedlich@gmail.com	98203	WA	c/o efsec@ut.wa.gov RE: Deny the Proposed Tesoro Savage Pipeline-on-Wheels Project Dear Governor Inslee, Mr. Posner, and Washington EFSEC, I urge you to assess the full impact of Tesoro Savage's proposal to ship 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and other Northwest communities. Oil-by-rail is a bad deal for Washington State. The project comes at a steep price for rail communities and the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's unprecedented proposal. The public safety and environmental impacts of the state's largest pipeline-on-wheels proposal deserve close scrutiny. For example, EFSEC must assess: The potential impacts of a large train-related oil spill along the rail route in Washington and beyond. The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route. The increased risk of an oil tanker spill on Washington State waters and along the shipping route. The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave. After carefully considering the safety, environmental, and climate risks associated with the project, I respectfully ask you to deny Tesoro Savage's application
Judith	Lienhard	lienjud@aol.com	97225	OR	The people of Oregon and Washington, my daughter, and fish and wildlife have a right to a healthy Columbia River! This proposal is not worth the risk!
Lindi	Light	lindlight@hotmail.com	97230	OR	NO pipeline on wheels for the NW
Penny	Lind	thehill@toast.net	97471	OR	
Andrea	Lindsay	andreamlindsay@gmail.com	98117	WA	My major concern is the strong evidence that the earth is warming, and the warming has been mostly caused by the emissions from fossil fuels. Continuing to burn oil will, I believe, increase damage to the planet. Another concern locally is the ability of the City of Vancouver to provide emergency services at the Port of Vancouver in case of a serious explosion or other major accident, as occurred in Quebec.
Alice Perry	Linker	twolinkers@comcast.net	98662	WA	
Sue Ellen	Liss	sueellen@heartspace.us	97056	OR	The worsening of climate change that would result from this project is a huge risk to our children and grandchildren, given the potential for positive feedback loops and runaway climate deterioration.
James	Little	littlejamesw@mac.com	98105	WA	
kurtiss	lofstrom	kurtisslofstrom@gmail.com	97212	OR	I enjoy the Columbia River as a nature enthusiast and recreationist. I know the River is already highly polluted, with fish having extremely high levels of mercury and PCBs making them unfit for human consumption. Opening this oil terminal would only further serve to pollute these natural spaces, upset delicate ecosystems, create suffering and death in animals, and cause human health problems. Look at the oil spills that have happened across the U.S. in the last few years: people are getting severe headaches, nausea, abdominal pain, respiratory problems, all as a result of the toxic chemicals in oil. Imagine how many human and non-human animals will be poisoned if something like this happens on the Columbia River. We are responsible for protecting the integrity of our natural spaces and all the creatures that share them. Please deny permits to this oil terminal for all of our sake. Short-term profits are not worth long-term suffering and devastation.
Karen	Looney	karenslooney@gmail.com	98105	WA	
Shawn	Looney	looneys@involved.com	97231	OR	Please, let's have no more poisoning (either directly or indirectly) of our precious Columbia River.
Glenda	Lovejoy	lovejoy@gorge.net	98635	WA	Nothing about this is good for the great states of OR and WA....very high risk for bad things to happen to the environment, the economies of each state, and the lives of the communities and to those of us who live along the river.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Alex	Loznak	alexloznak@gmail.com	97462	OR	
Thom	Luffin	thomluffin@comcast.net	98501	WA	
Jeff	Lyles	bjdeg@gmail.com	98675	WA	Tesoro had a quarter size leak in a pipe. It took them weeks to find it. Now, we have a football size oil soaked field that will never be able to grow crops or anything else on it again. Just giving a farmer money isn't going to make the field come back. When they ruin something, they ruin it forever.
Sheelagh	Lynn	sallynn@frontier.com	83869	ID	
Michael	MacDougall	jmaccdougall@excite.com	99026	WA	
Katherine	Mace	mace.katherine@gmail.com	97217	OR	As a resident of Oregon who lives on the Columbia River and loves the Columbia River Gorge, as well as all of the towns along the river down to the Pacific Ocean, and the north Oregon and southwest Washington coast lines, I beg you not to support this project. At the same time, I would like to urge you not to support the proposed coal terminals in Longview and Bellingham. Please do not allow our beautiful northwest corner of the U.S. to be downgraded by these massive projects that will bring negative impacts to our waterways, air quality, natural environment and quality of life. In the long run, preservation of these valuable resources will prove to be far more important than short term gain.
Craig	Mackie	beachbaum@nehalem.net	97131	OR	Coal will not only ruin the recreational aspects of the Columbia River but also affect all the people that coal trains/boats will pass near!!
Erin	Madden	erin.madden@gmail.com	97202	OR	
Mike	Madden	jmaddog@comcast.net	98607	WA	With the exception of relatively small revenue for Clark County and Washington State and maybe 120 jobs, many of which will be filled by out-of-staters, all positives are for Savage and Tesoro. The negatives are huge. The city of Vancouver will surely lose the drop the \$1.3 billion waterfront redevelopment plan. Who wants to live or recreate a mile downwind from an oil terminal? The whole program, from the Bakken operation to the transportation through scenic and residential areas and along the Columbia River to storing and transferring oil on the Columbia straits - literally. DO NOT ALLOW AN OIL TRANSFER TERMINAL TO BE BUILT IN VANCOUVER OR ANYWHERE ELSE IN THE STATE OF WASHINGTON. REPRESENT YOUR STATE RESIDENTS NOT THE OIL COMPANIES.
Ellen	Madsen	edimadsen@earthlink.net	98502	WA	
John	Malcomson	jmalcomson@yahoo.com	98199	WA	This business is not worth the risk of an oil spill that could poison the water and land, and consequently our food.
Lisa	Manning	pokman3@earthlink.net	97203	OR	Dear Governor Inslee! The carbon footprint can be stopped, so lets do it now!! Let's prevent further climate and environmental disasters and deny Tesoro Savage's application! We have the alternative technology, so lets use that instead!! Thank you!!
James	Mantone	waviowine@yahoo.com	98635	WA	
Popple	Mantone	popple@syncinewine.com	98635	WA	I live on the Columbia River one hour east of Vancouver, WA. I URGE you to deny this application. Let us not ruin our environment further.
Cynthia	Manycolors	manycolorsc@gmail.com	99201	WA	
Lloyd	Marbet	lloyd@marbet.org	97009	OR	
Emilie	Marlinghaus	emagen@bendbroadband.com	97702	OR	The Pacific NW must continue to set its environmental protection bar at the highest level. Allowing this potentially environmentally devastating project to proceed would be akin to dropping the bar entirely. Please reject this ill conceived and dangerous project. Thank you.
Dani	Maron-Oliver	monkeystrmonkeys@yahoo.com	98632	WA	
Daniel	Marshall	marshallontis1@yahoo.com	98004	WA	This is a potential disaster for the Columbia River (and its already endangered wild salmon runs), but it is also a goal-line stand for the human civilization. As James Hansen and others have said (more eloquently than I can hope to), if we are going to extract and burn the bitumen and other extended petroleum reserves, then it will be "game over" for our hopes to control global warming. These warnings need to be taken seriously.
carolyn	martin	carolyn.martin.mai@gmail.com	97205	OR	



First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Linda	Martin	lindamartin@yahoo.com	97117	OR	We moved to the Pacific NW because we felt that Washington and Oregon are states that care about the environment. Please don't allow these people to contaminate our lovely Columbia River.
Ron	Martin	rwmartin@mtu.edu	97031	OR	Governor Inslee, if not for the vision of Oregon Republican Senator Mark Hatfield and his influence over Pres. Reagan, we would not have the beautiful Columbia River Gorge National Scenic Area. Southern Washington residents fought the preservation and designation of the Gorge. Now, I am certain every Washingtonian knows that creating the national scenic area was a good thing. Please remind ALL residents of your state, even those down south, that there is no honor in selling out your beautiful natural resources, clean air and water, to a company that will spill it, and add to global warming. Please stand up for the beautiful Pacific Northwest and reject Tesoro's proposal. Thank you.
Sara	Matarazzo	saramatarazzo@comcast.net	97201	OR	
Al	McCarthy	aym73@hotmail.com	98052	WA	The risk/reward is not favorable to the overall health of our state. Too few jobs would result compared to the damage an accident could cause. There are already environmentally friendly development plans for Vancouver specifically that bring a far greater reward to the city and state. Thank you
Tim	McCarthy	tim.mccarthy1@comcast.net	98685	WA	
Debra	McGee	Zap_oregon@msn.com	97405	OR	I have lived in Washington, Oregon or Idaho all my life. The Pacific Northwest is unique in the beauty and clarity of its rivers and its air. Burning of fossil fuels is creating climate change. We must stop extracting, shipping and burning it! If not we may extinguish life on this planet as we know it. For the sake of all of us-Please don't allow this!
Dale	McLain	Daledmclain@gmail.com	98665	WA	We have lived in Vancouver for almost 40 years and I have had a business downtown for 25 years. Besides the damage this will do to the environment, it will destroy the downtown economy of our city. I have worked with the downtown association for three years, trying to make Vancouver a place where people would want to live, work and visit. Our Esther Short Park just won a big award and our city has been rated 100th of medium size cities for its quality of life. please don't take that away from us.
Linda	McLain	lindamclain@comcast.net	98665	WA	
Sean	McNeal	pcter23@gmail.com	97233	OR	I have only been here a short time but regardless I have seen the grandeur of the Columbia Gorge and the livelihood's that depend on it. I am a forester and wildlife biology student and so believe that the seemingly important need for energy pales when compared to the diversity and ecology of a system that has long stood before us and our insatiable appetite for more power. Please leave it be.
Sharleen	Meadows	ds4trv@centurylink.net	98629	WA	We watch all kinds of waterfowl on the Columbia River... please keep our rivers clean and healthy and free of possible leaks and contamination! Thank you!
Heather	Meinert-Mayer	vegariumnum@yahoo.com	97203	OR	
Anne	Meurer	oldmere@gmail.com	83864	ID	Last year two train cars derailed, due to weakness in the track from heavy rains, about 3 miles from our home area. We need to stop PRODUCING more coal and oil in the US, with all the toxins associated in the process, only to export it to Asia, where they are burning way too much coal already. Our country should stop producing the extra oil and coal, and change from coal and oil to sun and wind instead. Please use your common sense, and refuse the project in our area, to help stop the production at the sources.
David	Michalek	edm_austin@yahoo.com	97301	OR	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Insee and EFSCC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Dave	Miller	davem98607@yahoo.com	98607	WA	This project, in combination with the coal export projects, would increase the number of rail cars traveling through the Washington side of the Columbia gorge by 38 times the current rail car traffic. That means that there will be a train on the tracks nearly all the time. This will seriously impact wildlife at the three wildlife refuges in the western gorge - Steigerwald Lake, Franz Lake, and Pierce National Wildlife Refuge. eg. elk will no longer be able to migrate across the tracks like they currently do. They are frequently getting killed by trains now (I have documented 30 elk killed by trains at the Pierce refuge alone). With 38 times the traffic, they will be killed even more, and/or be completely isolated.
Emily	Miller	emily.r.miller09@gmail.com	97222	OR	
Susan	Millhauser	Susanm@spiretech.com	97211	OR	
Eric	Milligan	cpt.mcmilligan@gmail.com	v3e 3r7	BC	
Keith	Milligan	kongakeith@yahoo.com	99037	WA	
Rowena	Millis	millis.row@hotmail.com	98661	WA	Dear Governor Insee; Please, please consider the health of Vancouver, Wa's citizens and deny Tesoro any rights of transporting its filthy resource here in the community. Tesoro's N.Dakota oil spill of 20 million gallons of oil is the starkest reflection for what it truly is: greed and toxic pollution. Say NO to them. R. Millis Vancouver, WA
Monica	Mistead	gothrowwithmoe@hotmail.com	99208	WA	I don't USE it for anything, per say, but I deeply admire the beauty it provides for travelers along it's route. I also know many people who fish on the Columbia quite often as well. I see this river as an extremely important asset to everyone in the region and would be devastating if its quality was diminished by permitting oil trains to carry oil past it every day.
Leia	Minch	announcingme@msn.com	97405	OR	The Columbia River is the jugular vein of the Pacific Northwest. Allowing it to be contaminated by oil and letting the gas companies profit over citizen health is disgusting. The animals that live in the river, SALMON, a keystone to our environment and to our culture cannot withstand this type of pollution. I want to continue to use the Columbia for recreation purposes, and I want my children to do the same. Please, think long term health and not short-term profit.
Gary	Mings	gmings@hotmail.com	98682	WA	Show us the governor you truly are and veto this project from happening.
Jim	minick	jiminick@gorge.net	98635	WA	I live only one mile from the Railroad near Lyle, Wa. There would be the noise of the Trains, but also the danger of rail wrecks as happened in Canada recently. Over the years there have been a number of train wrecks in the Gorge, some of them putting cars into the River. That would be a disaster.
Deborah	Moggio	debbymog@yahoo.com	98640	WA	Clearly, this is a no-brainer. Burned here or elsewhere, we suffer the effects.
Amy	Monahan	amyfmonahan@gmail.com	97034	OR	
Cora	Monahan	coram@gmail.com	97034	OR	
Gregory	Monahan	gregorymonahan29@gmail.com	97034	OR	I am deeply concerned about the impact that burning the fossil fuels that will come through this terminal will have on the lives of my grand children and their generation. I urge you to allow the impact of the emissions from the burning of this fuel in the scoping process.
Patricia	Montague	patm452@gmail.com	97229	OR	I am a 84 Senior born in Portland who has returned to the area after living in San Francisco for 50+ years. I am very worried that our lovely Columbia River is endangered by this ominous threat from big business.
Joel	Morgan	jstevnm@gmail.com	97203	OR	I live and work in Portland, Oregon and the T-5 project is short-sighted and frankly, foolish. We need clean energy infrastructure projects, not projects involving fossil fuel extraction. Humanity needs clean energy and the employment that comes as a result. We both know this is true, so follow through. NO NEW FOSSIL FUEL EXTRACTION OR RELATED INFRASTRUCTURE PROJECTS! If you build it we will stop it, if you ship it, we will block it!
Tracy	Morgan	jampamorgan@gmail.com	99210	WA	Please do NOT let anything imperil our pristine waterways and the Spokane aquifer - the transport of oil is a huge mistake and a direct hazard. I voted for you Gov. J - please stop it from happening! TMorgan

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River, and how the proposed Tesoro Savage project would affect you.
Sarah	Morken	Otrism@gmail.com	98406	WA	Climate change affects us all. Tax the rich and fund green public works projects to provide jobs and transition the world off polluting, non-renewable fuel and onto green energy. The technology exists. See scientific american article about how to power the planet on renewables by 2030. The barriers are political not technological.
Susan	Morris	sgrebmorris@gmail.com	97212	OR	
Douglas	Morton	dugmorton@charter.net	95362	WA	
anony	mous	anonymouse@yahoo.com	97204	OR	The risks are too great. There is no such thing as fail-safe. Accidents can and do happen. I have kayaked on the Columbia and surrounding areas, on both the Washington and Oregon sides and realize what a precious, vital resource the river is. This is the time for green R&D, not business-as-usual. The only right answer (one you can proudly tell your grandkids) is "no" to the project.
Mary	Murphy	mmmurph195@yahoo.com	99203	WA	Please stop this project
Tammie L	Murray	jdmsm@hotmail.com	97138	OR	
Ann&Alan	Musche&Richards	ann.musche@gmail.com	98638	WA	We voted for you, and we hope very much that you will vote against this horrible dirty anti-environment proposal.
Sally	Myirea	info@RainforestWildlife.org	98652	WA	Export of oil products, such as diesel, gasoline, chemicals, etc. is a threat to national security because we would have to pay world prices raising the cost of transportation of freight and so the cost of living for everyone including food. We would run out of fuel and be unable to afford to heat our homes. Spills would make the Columbia River and beaches a hazardous waste site that cannot be cleaned up, killing fish we need for food and migratory birds like geese and ducks we also need for food, violating the Migratory Bird Act of North America. Our sloughs would be slimmed with oil, suffocating fish and water plants. The very beautiful Lower Columbia River Islands, shores and estuaries would become oil slicks that kill everything. There is nothing good about the proposed refinery. Many people live on the water and stand to have their homes ruined. The refinery at Vancouver is a horrible idea that must be denied. It's dangerous. many refineries explode into fireballs, burning everything including people, wildlife and homes. NO OIL REFINERY. Thank you.
Tom	Nadal	tnadal@me.com	98660	WA	This will not benefit our community.
Ray	Neff	rpneff@efn.org	97404	OR	There's no good reason to build this project other than profit. It's critical that you revoke this project as we fully transition to renewables to meet our energy needs here in the US and abroad.
Katie	Neis	Katie.M.Neis@gmail.com	97211	OR	Boo! This is awful
Chad	Nelson	mallynelson@gmail.com	98660	WA	In July of 2013 my wife and I purchased our first home in the Historic Hough District of Downtown Vancouver, WA. We were both VERY disturbed by the Tesoro/Savage proposal for many environmental reasons as well as personal reasons, since the proposed site will be approx 1.5 miles from our front door. Unless you have seen our little neighborhood you wouldn't understand how this will greatly impact the efforts all of us in Hough are trying to bring these classic homes/neighborhood back to life! Ours is a 1906 home that we plan on pouring our entire selves into! With this oils terminal so close, I'm afraid the value of what we are all trying to do there will be trumped by air pollution and the ticking time bomb of 360,000 Barrels of oil I've sat in on multiple Tesoro/Savage meetings so far (trying to have an opened mind) I can't honestly say I've heard a single plus that will benefit the multiple neighborhoods it WILL impact. I hope that you can find it on your moral compass to please ask them to propose this somewhere other than our beautiful waterfront. Thank you, Chad M Nelson
John	Nelson	joteg@gorge.net	97058	OR	I have already been a witness to the daily mile long (106 tank car) train that winds its way slowly down the gorge each day on its way to the west coast. When I see this dark mud colored train I shudder to think of this train having an accident and dumping its fracked oil load into the Columbia River and the difficulty of cleaning such a mess up. Now multiply this train load by perhaps 10 times and you have a real catastrophe just waiting to happen, to say nothing of the degradation of the quality of life for all the communities along the route of such trains. Please say no to such a ridiculous and dangerous idea.
Marianne	Nelson	Manelson316@yahoo.com	97202	OR	

First Name	Last Name	Email	Zip	State	Comment: let Governor Inslee and ETSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Ralph	Nelson	rjriverrock@gmail.com	99203	WA	The health of myself, my children and more importantly my grand children who have no idea how there health is being compromised by the "powers to be" in the name of profit. Thanks, R.J.
Mary	neptune	seagoddess75@hotmail.com	98683	WA	
John	Nettleton	jpn5710@yahoo.com	97202	OR	
Carolyn & Keith	Neubauer	ckneubmusic@q.com	98664	WA	We have very few options still available to halt the ongoing warming of our planet. We must take this opportunity to curtail further damaging our world. Continue use of fossil fuels will only increase global warming, we must look to re-newable sources for energy. And we must pro-TECT our cities from potential catastrophes, such as the recent one in Quebec!! PLEASE reject this project!!
Mary	neudorf	mknueendorf@comcast.net	97304	OR	
Bonnie	New	bnew1@live.com	97031	OR	
Tim	Newcomb	tnnewcomb@msn.com	98125	WA	I use or rely on the Columbia River in the following ways: (1) am a frequent rider on western Amtrak trains, and know from direct experience how the long trains with heavy loads have held up traffic along the Empire Builder route and stressed the rail infrastructure. We can expect the same types of problems along the proposed rail routes to the Vancouver oil terminal. 2. I am an accredited greenhouse gas inventory verifier in California and am well aware of the many ways that oil production and oil use by the end user contribute to the climate change problem. Why add to the climate change problem by encouraging more drilling, production and distribution around the world?
Carol	Newman	caroltov@pacifier.com	97103	OR	I urge you to deny Tesoro Savage's application. It will bring NO advantages to our communities or nation.
Brooke	Nicholson	bnicholson@inlandwindtrust.org	00820	WA	
charlene	niesen-webb	char1968@gmail.com	99019	WA	My boys & husband have been fishing with my father on the river since they were 3 yrs old. We windsurf & kitesurf on the river. We boat on the Columbia River. We look at the beauty of the Columbia River!!! No Tesoro in our state or on our river!!!!
Kirsten	Nolan	kirsten.nolan@gmail.com	99202	WA	
Michael	Nugent	mpn121@gmail.com	97202	OR	This is my home, please protect it from Tesoro Savage.
luther	oas	lmox37@gmail.com	98605	WA	already to much train traffic we have two crossings & they have to honk 4 times per crossing 100 to 150 trains per day & now huge amounts of oil no way what ever happened to protecting scenic areas.
Nicolette	O'Connor	nicolette.oconnor@yahoo.com	98661	WA	
Sunrise	OMahoney	s.h.omahoney@gmail.com	98660	WA	I do not live that far (not right on the tracks but close enough if an explosion happened and potentially for air quality issues). I have chosen to raise my children (16 and 9) in this community, one of the reasons is the clean environment. Bringing in oil through the rail right through our community and beyond, is completely against why myself and many of us live here. I understand the Port has land and wants to build and create jobs. This is not a good use for these requirements. The jobs brought in are not a lot of permanent jobs and the risk for our health, safety and environment are not worth it. I would recommend looking at a solar company to create green power in our community which is something that is sustainable and does not draw resources from our already taxed out environment--from my backyard to the state to the national and then international level. It is time we take a strong stand against fossil fuels and say no in WA state. There are alternatives, let's look at those before we bring in something so incredibly risky. I support the Columbia River Keepers statement above 100%! Thank you for your consideration, Sunrise OMahoney
Donna	Oman	omando65@hotmail.com	97702	OR	Please, Please, Please! Do not allow the Tesoro Savage Project to go ahead. The pollution risks are too great to the Northwest as well as the earth! If we and our progeny are going to survive on this planet, cutting pollution is mandatory! Do not approve this project! The time is NOW to stop it!
jeanette	O'Reilly	nobodysdarling87@gmail.com	97089	OR	An avid outdoors woman, and career towards Wildlife Conservation.
Kevin	Orr	kevinorr@makeyouhappen.com	98682	WA	Too much traffic. High risk of pollution. I love our greenery and clean air.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and F55C know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Rosalie	Osborne	mikeros@comcast.net	98258	WA	This project could destroy our ecosystem in the Columbia River should we have an oil spill. Our fishing industry would be greatly impacted. We enjoy hiking and frequently hike above the river to the falls along the Oregon side, views would be blocked by the trains.
Robert James	Ouellette Paine	bobol121964@att.net akaj2005@yahoo.com	06051 98201	CT WA	Not only will my friends and everyone else who lives near the Columbia River will be affected by the polluting of the tar sands, but everyone and everything that lives on our planet Earth will suffer for many generations from the effects of the tar sands that will be used by other countries. I urge you to use your political powers to stop the shipment of the tar sands.
Key Mike	Paine	kpaine@yahoo.com	98201	WA	The Columbia River is essential to the lives of many species and also to the people who live along it and rely on it for their livelihoods and health. It has already been polluted with industrial waste and radiation. Putting a train filled with oil that follows the river makes it only a matter of time before a severe spill occurs, further risking the health of this magnificent river. The fact that the people of Washington values this river caused us to try to preserve parts of it through the national scenic monument. What would an oil spill do to that? Also, Governor, you just signed an agreement with the other West Coast leaders to reduce greenhouse emissions. As such, we do not want our state to foster an activity that continues the contamination of our atmosphere that will eventually kill us all.
Carrie	papas Parks	mp2new@gmail.com carparks@comcast.net	97213 98682	OR WA	
Kathy	Peirce	kathymariep@gmail.com	98660	WA	The Columbia River Gorge is a national treasure which is at an environmental risk when, not if, there is an accident. I live in Fruit Valley which is adjacent to the Port of Vancouver. Our livability and health are most affected by the toxic fumes which will be released during the combustion process. Please SAVE our neighborhood.
Josie	Peper	peper.jc@gmail.com	97103	OR	We don't need to be shipping our natural resources overseas; nor do we need these threats to our safety. The National Transportation Safety Board has warned 5 times that these rail oil tankers are unsafe for a variety of reasons. 47 people died in Canada from one of these trains derailing. Please keep the citizens safe and do not cave to these special interests.
Martha David	Perez Perk	marthaoperez@yahoo.com davidperk@comcast.net	97209 98115	OR WA	We have a very limited amount of time to transition our society off of fossil fuels. Developments like Tesoros' are counterproductive and will only accelerate climate change. The fate of future generations is in our hands. The Tesoro proposal must be denied. Its long term impacts far outweigh any short term benefits to state revenue, local employment or Tesoro shareholders. And the near term risks to the Columbia from train derailment are unacceptable. The Tesoro proposal must be denied.
Sherry Judith	Perkins Perry	Perkshe@gmail.com judylofperry@hotmail.com	98178 97232	WA OR	The natural beauty and wildlife of the Columbia River are all one ecosystem - we must not risk it with potential oil spills that experience shows can not be removed.
Tiffany Diane	Perry Peterson	Tiffperry.12@gmail.com eleor@cni.net	97526 98675	OR WA	My family enjoys the Columbia river for fishing, swimming and boating. The Tesoro Savage Project would make our time on the river more dangerous and dirty. Please do not allow
ursula Rita	petralia Pinchot	upetralia@yahoo.com ritapinchot@gmail.com	98647 98115	WV WA	Please take a strong stand to protect our environment for families in Washington State.
Robert and Jean Nancy	Pollock Pope	jpollock@riouasa.com Nancypope@comcast.net	97471 98034	OR WA	Climate change is real and if West Coast Democrats won't oppose it, who will?
Mary Debra	Porter poscharscky	maryporter23@gmail.com debforevers@gmail.com	97233	OR	Dirty air, dirty water and dirty land!
Theresa	Potts	pottstheresa2@gmail.com	83815	ID	These trains will be traveling over the aquifer that supplies water to people in North Idaho and the area around Spokane. A spill would be disastrous. These trains are using tracks that cross highways (and many others) use on a regular basis. This train traffic is going to cause huge traffic problem, especially for people going to and returning from work.

First Name	Last Name	Email	ZIP	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Jim	Powers	jimvsc2@gmail.com	97321	OR	Governor Inslee, As an Oregon resident we enjoy the Columbia River on a frequent basis. We are proud to live in a region that is clean, non-polluted, and wild. More trains carrying toxic chemicals along the river will, in time, ruin the region for all of us. Don't let greedy companies turn the Pacific Northwest into a Pennsylvania. In addition, it should be noted that the EPA's Social Cost of Carbon tables show that this single project will release enough carbon dioxide into the atmosphere to cost all the rest of us (members of society) anywhere from \$45 to \$400 Billion dollars in damages over a 35 year project. (details at: <a href="http://www.coalmarch.org/5-7-tillion-dollar-terrace-subsidy-ple/">http://www.coalmarch.org/5-7-tillion-dollar-terrace-subsidy-ple/</a> ). This project must be denied both on regional and planetary grounds. Thank you Jim Powers
Brady	Preheim	brady@preheim.com	97056	OR	We need the oil we produce. These project(s) are about exporting our natural resources to other counties for a quick profit - that does not meet with the long term needs of the US. I oppose this.
Tracy	Prescott	tracypmac@gmail.com	97016	OR	We have a farm right on the Columbia River. Any accident would devastate the wildlife, our livelihood and our home.
Kathleen Grady	Procter	kamp999@hotmail.com	98682	WA	We think you already know what to do. Protect our wonderful state, and the Orcas we can't replace. Thank you so much Gov. Inslee!
Ryan	Provonsha	rprovonsha@gmail.com	98087	WA	
Carolyn melanie	Pugh quigley	carolynp2003@yahoo.com me@gorge.net	98686 97031	WA OR	I live, recreate and work very near (and in!) the Columbia River. In the 27yrs I have lived here I have sadly observed the increase in noise and air pollution all through the gorge. Please consider quality of life over oil, in the gorge and on the planet, respectfully, Melanie Quigley
Barbara	Quinn	barbaraqnm71@gmail.com	97203	OR	Look for economic development projects that are green and clean, instead of ones that harm the health and well-being of citizens.
rick	rappaport	rick@rickrappaport.com	97205	OR	
Fraser	Rasmussen	rasmussen43@gmail.com	97035	OR	Those of us that live near the Columbia River and value it as a precious resource are appalled at the prospect of oil trains being allowed to spoil that environment. The risk of a major environmental accident is too high to let this happen. Please deny the approval of this oil port to go forward.
Pat	Rasmussen	patr@crownet.com	98508	WA	Save oil for our future use, not export!
Lora	Rathbone	lora.rathbone@charter.net	99354	WA	
ruth	rawhouser	ruthandward@gmail.com	97211	OR	
Linda	Reedijk	greengirlpdx@yahoo.com	97239	OR	I'm very concerned about the health impacts from increased pollution and possible oil spills, the hazards of increased train traffic and the hazards and climate risks of tar sands oil.
Mike	Rees	mgrees@comcast.net	98199	WA	
Tia	Regan	regantia@gmail.com	97215	OR	We cannot stand by and allow this project to hasten the disaster that fossil-fuel caused climate change is bringing to our planet and affecting all of our lives.
Diana	Rempe	dianaremp@gmail.com	97217	OR	Our future depends on shifting from a reliance on fossil fuels to lower consumption and renewables. Shipping oil via train only moves us further from this. Please deny this application. Thank you Diana Rempe
Moria	Reynolds	Moriaanne@gmail.com	97031	OR	
Douglas	Rich	Douglas.rich@comcast.net	97034	OR	Contributes to further degradation of sensitive environment. Big oil and coal companies have shown time after time inability to prevent costly accidents harming people and habitats.
Sharon Christal	Rickman riley	sharonrickman495@comcast.net rosalee3022@yahoo.com	98661 83854	WA ID	We do not want dirty oil on our river!!!! stop the madness and find an alternative energy source IE solar, thermal, wind.....
Laura Cal	Rivendell Roberts	laura.rivendell@yahoo.com crobe86209@aol.com	98056 98665	WA WA	I drive the columbia gorge about once a month to visit my family in Spokane. I want to be able to have my grand children be able to appreciate the area as I do. How much is a river worth?

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and ESSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Dina	Roberts	robertsdina@gmail.com	98660	WA	I live within a mile of the Columbia River and downtown Vancouver. This is my home, I run down to the river and along the Fort and river front. I ride my bike to Lake Vancouver and spend most weekends in downtown with friends and family. We don't want to have our lives and our homes (my personal largest investment) at risk by this type of dangerous development. The transportation used to move this oil is dangerous and puts the communities along its path at risk. We can do better here in Washington State. Reject this proposal. Thank you.
Arnold	Rochlin	rochlin2@comcast.net	97283	OR	
Roger	Rocka	fjrocka@gmail.com	97103	OR	
Brent	Rocks	brent_rocks@comcast.net	97201	OR	
Kyle	Roinick	charo33@centurylink.net	97451	OR	
Emily	Rome	im.m.rome@gmail.com	97202	OR	
Linda	Romero	obamamama.romero@gmail.com	98682	WA	Please think long term. Wealth for few at the cost of millions. 120 (better)community jobs could be more easily be made in local shops and housing for the area, which is already rapidly expanding. Ty for working on the nuclear clean up, we can't afford a shale clean up too!
Sara	Rondeau	sara.rondeau@gmail.com	98682	WA	The pipeline noise and dirt will change the feel and function of Vancouver, especially the amazing areas along the river. The length and frequency of trains would transform the entire area into an industrial thoroughfare, diminishing value and benefiting...the oil company? We'd be giving up too much, it would be an irrevocable mistake.
Rick	Rosenberry	Rosenberry@msn.com	98125	WA	I have lived in the Pacific Northwest my entire life from Eastern Wash to Panhandle of Idaho to Montana to Eastern Oregon and now Western Wash. The Columbia & Snake Rivers are the sacred life blood and must be protected at all costs.
Kay	Ross	KayJaross@q.com	97223	OR	
Michelle	Roth	Michaton@yahoo.com	98660	WA	My family and I live a short distance from the proposed terminal site in Vancouver. I worry about my children's health and safety from pollution as well the potential for catastrophic accidents. These are not the kind of jobs we need. Please give the Vancouver waterfront a chance to thrive and be developed for less toxic and dangerous uses. This is a great neighborhood! Please help us keep it that way. AND say no to fracking!
Francie	Royce	froyce@comcast.net	97210	OR	Please reject the Tesoro Savage project. Think about the broader concern for health and public safety and reject the shipping of so much crude oil along the Columbia River and by land through our communities. Thank you
Thomas	Rozier	trozier@gmail.com	97205	OR	
Stephanie	Rufner	smrufner@yahoo.com	97006	OR	
Sarah	Ruhl	saruhl@comcast.net	98660	WA	We live above the railroad tracks and already feel the impact of commerce and related pollution.
Barbara	Sack	barbara3820@earthlink.net	97218	OR	I spend a lot time hiking in the Columbia Gorge and live in Portland about 1 mile from the Columbia River.
Deborah	Samuels	sammzyd7788@q.com	97217	OR	I am deeply concerned and upset at the prospect of 360,000 barrels of crude oil being transported through our pristine Columbia Gorge. We have worked so hard to protect this precious resource. One catastrophic oil spill would contaminate the waters of the Columbia for years, a fire would devastate the region and risk thousands of lives. The idea of four trains a day that are a mile and a half long each is difficult to imagine, but add this up with the proposed coal trains, there could be over a dozen. The traffic delays caused by this would only be the proverbial tip of the iceberg. Increased diesel emissions from these trains means dirtier air for all of us in the region, increasing the risks of cancer, asthma, and cardiac conditions. The oil itself is "dirty," it is obtained by fracking, which pollutes aquifers and surrounding agricultural lands. Why are we being a party to this? The combustion of this oil will release over 56 million tons of carbon dioxide each year. Our planet is dying from greenhouse gas pollution; global warming is not just conjecture, it is proven. PLEASE DO THE RIGHT THING AND STOP THIS INSANITY IN ITS TRACKS. THE PROFIT MOTIVE SHOULD NOT TRUMP OUR SAFETY AND THE SAFETY OF THE PLANET AND THE PEOPLE LIVING ON IT.
Kathleen	Sanchez	arttoad1@gmail.com	97203	OR	We can't afford the risk of an oil spill in one of our greatest natural assets, the Columbia river. Protect the salmon, protect our environment, protect the water.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Patricia	Sanders	pat.tilton@gmail.com	97213	OR	Dear Governor, The Columbia River is already being radiated, contains lead, is over dammed and fished, let's not compound the problem with oil shipments.
Steve	Sanders	stevehydros@gmail.com	97211	OR	
Kris	Saries	elliott1972@gmail.com	97209	OR	Allowing something like this would destroy the columbia river. Spills and leaks of great magnitude are inevitable. Once the damage is done we cannot go back. As a community we are also aware of how "clean-up" efforts by the fossil fuel industry results in more harm to people and the environment!! Please say "NO"!!!
Susan	Saul	susan103saul@gmail.com	98664	WA	Today's business news headline "Export ban on oil may face challenge" (Columbian, Nov. 7, 2013, p.C6) unveils the true intentions of the oil industry, including Tesoro and Savage. This oil-by-rail deal ultimately will not benefit Washington State if the crude oil is loaded on ships for direct export to foreign markets. We are being asked to assume all the risks of large train-related oil spills, public and environmental health impacts of additional train traffic, increased risks of tanker spills, and the project's impacts on climate change without receiving any benefits. Tesoro Savage's project has nothing to do with U.S. energy independence and all to do with record industry profits. The news story says, "Exporting oil would give producers greater ability to get a higher price for their crude." I urge you to deny Tesoro Savage's application.
Grant	Sawyer	gsawyer44@gmail.com	98674	WA	I often hike in the gorge and think it makes no sense to endanger this precious world hiking destination for such a small number if jobs the oil trains will bring to Vancouver. Please do all in your power to stop this rather bad idea.
Thomas	Scharf	proudprogressive.wa@gmail.com	98684	WA	I am concerned about emergency response times across tracks and devastating potential of spills into the Clark Fork River, Lake Pend Oreille, and the Pend Oreille River. It isn't a matter of if there will be derailments, but when. I have lived in Bonner county for over 30 years and have witnessed three derailments. Please consider the potential hazards versus the no benefits for your neighboring state Idaho.
Bill	Schaudt	bschaudt@gmail.com	83860	ID	
Thomas	Schmidt	schmidtomw@yahoo.com	99203	WA	Hello Governor Inslee! How very please I am that I can call governor Inslee because was one of your very loyal volunteer campaign workers in 2012. I spent many hour telephoning voters about your support cleaner energy jobs. Yes the proposed oil terminal would bring needed jobs to a Vancouver that badly needs them, but please consider the potential environmental hazards associated with this dirty energy source. Imagine the environmental damage that a single oil spill could cause to the Columbia River. The potential damage really is worth the creation of this oil terminal.
Rick	Schmitt	romegaman@gmail.com	98668	WA	
Joseph	Schofield	josephschofield@gmail.com	97218	OR	We have to draw the line for fossil fuel companies. They are amassing great wealth at the expense of our people and our land and have a TERRIBLE track record of disrespect for both.
Jenifer	Schramm	shadydogs@msn.com	98144	WA	
Mike	Schutt	fishincoug@yahoo.com	98260	WA	Keep oil away from the fragile Columbia River! We need a solar panel terminal not an oil terminal. Deny the Tesoro permit.
Charles	Schweiger	schweigerstudio@yahoo.com	97103	OR	
paul	seabrook	paul.seabrook@gmail.com	98663	WA	



First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
paul	SEAMONS	pseamons@earthlink.net	97054	OR	We need to stop the export of fossil fuels - LNG, petroleum, coal - from the Northwest. Here's why. We need to reduce carbon emissions worldwide. Soon, it is obvious that the legislative process in Washington DC will not address the issues of climate change and the increasingly obvious and costly subsidy (in the form of environmental degradation and climate change) that we all are forced to contribute to the fossil fuel producers. At some point we need to reduce the burning of fossil fuels and develop alternatives that have less climate impact. Let's start NOW by making it impossible to extract and transport fossil fuels to market. Leave the fossil fuels in the ground. There is no free market solution to climate change. The free market does not and cannot price fossil fuels at their true cost of production. The market has no way to include the environmental costs of that production - the human health effects, the degrading effects on the land itself, and particularly the global climate change effects. These environmental costs are and will be borne by all of us and our children while the benefits of fossil fuel production accrue to the very few.
Barbie	Sears	barbie.sears@yahoo.com	97470	OR	My family lives here in Oregon and I oppose the use of the Columbia River for transporting dirty coal and/or oil. Please reconsider alternative methods of making money and not at the expense of our lives!!! Please and thank you very much.
Kathrin	Sears	kds2119@gmail.com	97031	OR	
Neil	Seigel	neisel@comcast.net	97218	OR	
Anthony	Serres	serresa@hushmail.com	97268	OR	
Linda	Serres	lseight2@aol.com	97045	OR	We all share the Columbia River. No one has a right to endanger the river all the people who live around it. Please protect it and us!
Jill	Severson	jillms@iclarlark.edu	97228	OR	
Neil	Shargel	smithrockneil@gmail.com	97212	OR	According to the proposed plan, Oregon would see 50 trains a day traveling through the gorge to and from transport stations in Boardman, St. Helens, and Coos Bay. There are three other transport sites in Washington: Bellingham, Grays Harbor, and Longview. Coal dust is full of heavy metals such as arsenic, cadmium, and benzene as well as volatile organic compounds. These known carcinogens can cause heart attacks, strokes, asthma and black lung disease. The transport stations require a LOT of land but they need few people doing the work in that space. For example, the proposed site in Longview, WA needs 416 acres of heavy industrial waterfront and would create 70 jobs. That's less than 0.2 jobs per acre. (Northwest Coal Exports, by Eric de Place, Sightline Institute, Sept. 2011). The burning of coal across the Pacific would impact everyone in the Pacific Northwest because winds bring back mercury and other toxins and the mercury makes its way into Columbia River fish. As the coal is transported, each train will spill 125 pounds of coal dust particles per mile within one and a half miles on either side of the track. 6,691 coal trains traveling along both sides of the Columbia River from the Hermiston area in Eastern Oregon westward would spill 836,375 pounds of coal dust particles per mile per year for decades. Long stretches of the Columbia River could absorb [approximately] 400,000 pounds of coal dust particle spillage per mile per year. This does NOT include coal dust particle spillage from 5,333 standard coal barges per year from Port Morrow to Port Westward. (Coal Train and Barge Numbers Staggering, Oregon Environmental Disaster Assured, by Richard Ellmyer, ellmyer@macsolive.com) In Seward, Alaska, for example, residents have sued the local terminal operators because coal dust blowing off the terminal's stockpiles regularly coats nearby fishing boats and neighborhoods with debris. Burlington Northern Santa Fe Railway admits that its four daily coal trains moving through Washington lose a staggering 120 tons of coal dust daily. Mercury is released into the air from the combustion of coal. This mercury accumulates and concentrates in the food chain, where it is ingested by people (often through eating fish). Read more: <a href="http://www.groundtruthtrekking.org/issues/AlaskaCoal/CoalMercury.html#ixzz2nIKRy2Em">http://www.groundtruthtrekking.org/issues/AlaskaCoal/CoalMercury.html#ixzz2nIKRy2Em</a>
Brian	Sharp	eldinium@fastmail.fm	98672	WA	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inlee and ESSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Katherine	Shields	katecoach@yahoo.com	97229	OR	Stop the madness of polluting the air water and land for many, many Oregonians and Washingtonians from a dangerous and filthy Tesoro Savage "pipeline on wheels". More highway risks, more asthma, more polluting residues are BAD for our states and BAD for our economies. Businesses are allowed to run whole hog polluting then leave the people sick and dying with the States left with the bill to clean up. NO NO NO
Bruce	Shilling	brucehilling@yahoo.com	98103	WA	Do not ship oil through our state. The economic gains are not worth the risk!
Kathi	Shirley	kshirley@comcast.net	99019	WA	1. Pollution OF a National Treasure 2. Stop further destruction of the Salmon (We have seen what dams can do)
Thomas & MaryEllen	Showalter	showalter1035@comcast.net	97210	OR	3Fossil fuels effects are destroying the planet.
Yoko	Silk	yokita@gmail.com	97211	OR	
David	Skattebo	davidorskattebo@gmail.com	98502	WA	
Susan	Skinner	teluncan@pacifier.com	97103	OR	I have lived in Astoria most of my life. Seeing the River destroyed by the fossil fuel industry would be tragic. I also use Amtrak frequently, and have this sinking feeling the four-mile trains will effectively kill passenger service--as well as the economies of towns and cities these trains cut through.
Christina	Skirvin	christina@columbiariverkeeper.org	97031	OR	
Katherine	Skirvin	kzskirvin@gmail.com	97801	OR	I live near the Columbia River and travel the I-84 corridor between Portland and Pendleton often. I enjoy photographing and hiking along the Columbia River. Please do NOT approve any commercial venture such as this which creates real safety and environmental hazards. This is close enough to call my backyard, and I don't want its livability compromised any more than it already is!
Billea	Smith	billea_smith@live.com	98632	WA	I have lived in cowlitz county and swam in the columbia river for over 30 years and have been scared to allow my children near it for several years now. It's time to think of the future of our planet, fish & wildlife & our children. Stop the Tesoro savage project, it's just not worth it!
Billea	Smith	billes_smith@live.com	98632	WA	Please think of our, the needs of the planet and the impact on all! We should do better and we can, while leading the way setting a positive example for generations to come!
Carolyn	Smith	cmkerf@seasurf.net	97146	OR	
Julie Ann	Smith	julieannsmith61@gmail.com	98661	WA	We live 100 yards from the BNSF Tracks in the beautiful Columbia Shores Village on the river. The current train traffic, at least 16 trains every 12 hours, is very loud (70 -90 dB) and negatively effects our neighborhood livability and property values. Consequently, do not use our patio and my sleep is disturbed. Often, the noise sounds like an explosion and rattles the windows (we have 4 panes of glass as noise abatement). This property along the riverfront is rare and special. Families flock to the trails here all summer just to soak up the fresh air and scenery. What a shame to send heavy, polluting, noisy, large locomotives and now oil through the heart of this very fragile riverfront community. The tracks are so close to the riverfront trail that a derailment could result in catastrophic damage. Should the train derail while families, children, dogs, grandmothers are walking three and four abreast like they did all summer we could have a community tragedy here along the river. Please protect our neighborhood from this potential threat.
Karl J.	Smith	karl@onetruekarl.com	97225	OR	
Rob	Smith	rsmith@npca.org	98109	WA	
Shauna	Smith	shaunasm@msn.com	98115	WA	We fish the Columbia River and we need to keep this resource clean. Thank you.
Tiffany	Smith	tiffanysmith@gmail.com	98117	WA	
Andy	Solz	asolz@gmail.com	97080	OR	
Herschel	Soles	herschel@spiritone.com	97211	OR	Governor Inlee, if a comprehensive study of the effects the Tesoro Project is made, the only decision is to deny Tesoro Savage application.
Nick	Southall	nicksouthall@yahoo.com	97031	OR	
Paul	Spindel	pspinde@msn.com	97068	OR	We need to continue to do better. This thing is more of the same type of business that has gotten us into the mess we are in. We don't need the risk of spills. Protect Mother Earth. Do the right thing.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Debbie	Spitzenpfeil	silverhorsefarms@hotmail.com	97034	OR	I live in Deer Island right along the Columbia River. As it stands now, I see our River with pollution, and I can't imagine how it would be with trains filled with oil and coal. I plan to move out of the area and to another state if this goes thru. Both my husband and I are business owners and this will mean our businesses will leave too. I will not live or do business near this type of danger!!!
Carl	Spotz	cspotzrun@gmail.com	98203	WA	Please support out opposition of this fossil fuel terminal
Donald	Springer	donaldspringer@aol.com	98662	WA	Just recently an oil spill in N.D. ruined a farmer's land for any hope of a crop for several years. We do not want any spills from the tanker cars to ruin our land as well.
Patricia	St August	bookwomyn@yahoo.com	98801	WA	Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's unprecedented proposal. I am very concerned about public safety and environmental impacts that the state's largest pipeline-on-wheels proposal will cause. I have been following this project as it crosses the states and Canada. There are many people who are against it.
Roderick	Stackelberg	rodstackelberg@comcast.net	99203	WA	Please deny this project for the sake of the environment and public health.
Geri	Stanfield	Forestspringacupx@yahoo.com	97232	OR	
Robert	Stang	liveearth1@aol.com	97103	OR	
Janelce	Staton	msjdstaton@frontier.com	97006	OR	
Don	Steinke	crVancouverUSA@gmail.com	98682	WA	When I was born, CO2 levels were about 320 parts per million. Now it's nearly 400 ppm and rising. The pH of the ocean has changed so much it has crippled the Oyster industry in Willapa Bay. The Oyster industry has even asked the Governor to put an ant-acid in the affected waters. The last time CO2 levels were this high was when dinosaurs walked the earth and oceans were 200 feet higher. The majority of scientists say it is urgent to reduce greenhouse gases, and if we don't, this planet will not be fit to live on by mid-century. I want you to study all the impacts from the fracking fields of North Dakota to the tailpipe. Be sure to include climate change and ocean acidification. How many people on your commission understand the impacts of Climate Change? Which agency is in charge of Climate Change? Gifford Pinchot said the public trust was about providing the greatest benefit for the most people for the longest time with the least harm. You have a trust obligation to protect the interests of all present and future generations of citizens. I want your report to say how this project honors your public trust obligations to my grandkids. Lastly, you should not be hanging out with Larry Paulson, He was behind the effort to bring this project to the table. Don Steinke
Mary	Steller	marybee@west.net	98643	WA	
Claude	Sterling	eshadow69@hotmail.com	97801	OR	Use of the Columbia Rv and its tributaries to enjoy and pursue; sport and commercial fishing, kayaking, wind-sailing, photography, and for clean water for domestic and industrial use.
Victor	Stevens	victor.j.stevens@kpchr.org	97202	OR	
Martha	Stevenson	marthaz@gorge.net	98672	WA	
Rev. Vicky	Stifter	vstifter@gorge.net	97031	OR	My family and I live in the Gorge & we want a clean, safe future for our children—and all of the children in the Gorge.
Wade	Stoddard	wadestoddard@yahoo.com	97217	OR	
Carolann	Storli	ctorli@gmail.com	98102	WA	We have a home in the Columbia River Gorge and we have seen the region develop as a result of the winds and the Senic Act. People have been drawn to the region first for its beauty and then for the recreation, restaurants, wineries, breweries, shops and lodging. Don't let big Coal and big Oil ruin the gorge!
Walter	Strandhagen	walterbrenda41@comcast.net	98607	WA	
Brenda	Strange	brenstr@yahoo.com	99204	WA	
Cynthia	Strid	cyndistrid@gmail.com	98672	WA	YOU WOULD BE CRAZY AND IRRESPONSIBLE TO APPROVE THE COAL TERMINAL PROJECTS DUE TO THEIR IMPACT WHEN BURNED TO HEAT UP OUR CLIMATE MAKING IT UNLIVABLE FOR YOUR CHILDREN AND MINE. PUT YOUR \$\$\$ AND YOUR EFFORT INTO RENEWABLES FOR THE NW AND THE PLANET. CYNTHIA L. STRID
Roger	Strong	raven98337@yahoo.com	98310	WA	
Larry	Stryker	Lstryker@gmail.com	98607	WA	We have enough problems with Hanford clean-up let's keep big oil out.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Paul	Suter	suterp@comcast.net	97301	OR	My wife and I and friends and family frequently sight see and recreate in the Columbia River Gorge on both the Washington and Oregon sides. We are opposed to negative environmental, cultural or social impacts on any aspect of the gorge whenever those impacts can be avoided. Impacts from oil pipelines-on-wheels can be eliminated by saying no to Tesoro Savage application for such uses.
Rae Susan	Svendgaard Svensson	rsvendgard@msn.com svensumati@me.com	97212 98572	OR WA	I am a White Salmon resident I live in the Gorge for the windsurfing I want a clean unpolluted river to play on.
Lorena	Swan	swans09@msn.com	99202	WA	I swim, fish, and camp along the Columbia River. I care about the environment and the impact that the contents of these oil-by-rail route can cause. Man made technology is never fool proof & I wouldn't want to have to react to a spill, leak, wreck, or any type of catastrophic event that this would cause. I care much for future generations, sensitive ecosystems, and the water to allow corporations to tempt fate for a profit that won't be noticed in this region. I hope you consider that I speak on behalf of the people, animals, trees, water, and air, that don't have money backing it's agenda, this is about sustainability & responsibility. Thank you for your time.
Larry	Swartz	lswartz79@hotmail.com	99201	WA	I am opposed to the Terminal
Kathleen	Sweet	kathleen.sweet@sbglobal.net	97437	OR	The Columbia River, in addition to being a precious natural resource, is the largest shipping terminal for US wheat, among other commodities. What would one spill do to that capability?
Daniel	Swink	drswink@pacifier.com	98666	WA	I already hear the countless trains that wake me up at various sleep hours of the night with all the loud noise they make with horn blowing, crossing noise, hundreds of train car noises, and other side track stand-by noise that carries for many miles of distance. I cannot imagine how people are supposed to live normal lives with the vast increase in train traffic noise and train pollution that will ensue. It is already a stressful sleep-depriving and air pollution nuisance as it is. Please stop these type of runaway impacts on our community's livability that the train companies have not been held accountable for.
Nick Nancy	Szumilas Tague	Szumilasn@yahoo.com nancytague@centurytel.net	98144 97447	WA OR	As an Oregon resident, I treasure the magnificent Columbia River and the Gorge as unmatched natural environments. Its beauty is as valuable as its natural resources (fish, hydropower, transportation, etc.). As a resident of planet Earth, I treasure the irreplaceable earth environment. With every action, we need to consider our impacts on those environments. The short-term and long-term impacts of the Tesoro Savage project are not positive. "Business as usual" needs to be replaced with restraint and creative problem-solving.
Diana	Talcott	dianatalcott@gmail.com	97214	OR	We must start looking at the Big Picture, the long view, and start moving away from fossil fuels. thank you so much for your thoughtful consideration.
John	Tallyn	john.tallyn@gmail.com	97205	OR	Stop destroying our river, stop supporting dirty energy.
Maye	Thompson	mayedoug@spiritone.com	97215	OR	
Stephen	Thompson	steves3thompson@gmail.com	98052	WA	
Christine	Tolotti	gorgeraptors@gmail.com	98605	WA	We live three and a half miles above the Columbia River and we chose to live here for the way of life associated with the Columbia - recreation, clean air and the stunning beauty of the Gorge. As a retired couple, we could have chosen to live anywhere in the USA - my husband retired from the US Navy - but we chose to live here, in the Gorge for the reasons I stated. We have taught our five children, spouses and most of our fourteen grandkids to love the Columbia also and appreciate the bounty of the waters - anadromous fish. The entire family loves to be here and eat fish they have caught, not once or twice a year, but throughout the fishing season. We do not want to have our health or the health of the Columbia River systems compromised!!! PLEASE DO NOT APPROVE TESORO SAVAGE'S APPLICATION!!! Respectfully submitted, Christine Tolotti
sophie	tonasket	sophie@aicinc.org	99202	WA	My family have fished in the Columbia River for many years. My hope is that the Tesoro Savage project will not be allowed to put the Columbia River at risk.
James A.	Torgeson	jsalts@pccz.com	97215	OR	
William	Tracy	billtracy@comcast.net	99223	WA	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Judy	Treman	ptreman@charter.net	99362	WA	Trains already run very frequently through the Gorge--detrimental to habitat. If oil is transported there will be spills and they would be devastating to the river, land and wildlife. Stop it before it happens!
Liz	Trojan	elizat8@pobox.com	97219	OR	Just say "No" to Tesoro!
Karen	Trusty	ktoba@comcast.net	97215	OR	
James	Tyree II	jamestryreeii@gmail.com	97225	OR	We do NOT want more oil gas and coal development. These developments encourage dirty energy when what MUST be done is the replacement of dirty energy with clean renewable energy sources and the development of THEIR supporting infrastructure. Get on board with the future and deny the Tesoro Savage project!
Alex	Uber	Alex.uber@gmail.com	97219	OR	I love to hike the trails along the gorge and my wife and I enjoy the falls and stay at the various lodges. The Columbia Gorge is a gem that attracts many, many people and on whom others derive their income on tourism. What an awful shame it would be to have it fouled by an oil spill or some other disaster involving the transport of natural resources down the river. We have been pretty successful in fouling our planet as a nest. Now we have a chance to avoid a catastrophe. Don't permit a corporation to destroy it just because their only interest is making profit at the people's expense.
Fritz	Ulrich	fjulrich1940@gmail.com	97304	OR	
Betsy	Valle	Betsyvalle@gmail.com	97203	OR	Please let common sense prevail!
Angela	van Patten	angelavanpatten@comcast.net	97214	OR	Dear Governor Inslee and EFSEC, As you know, at some point we need to accelerate the shift to a post-fossil-fuel energy infrastructure, including in Washington State and Oregon. With the warning signs flashing red in terms of global climate change, it's time to go full speed ahead with solar, wind, and geothermal development, as well as retrofitting for energy conservation. Easier said than done, but it's a challenge we need to rise to. Such infrastructure development, running, and maintenance will all be sources of high quality employment in the region, while minimizing degradation of the environment in Washington/Oregon and worldwide. Secondarily, along with many people, I treasure time I am able to spend hiking in the Columbia River Gorge. 8 crude oil trains (each 1-1/2 miles long) going through that beautiful area will degrade it both directly through diesel particulate emissions and indirectly through the end-use, releasing carbon dioxide into the atmosphere, causing damage to oceans and the world's climate. Thank you for considering these impacts in the environmental impact assessment for the Tesoro Savage proposed project in Vancouver, Angela van Patten Portland, Oregon
Judy	VanderMaten	vanto@centurytel.net	98612	WA	As a resident along the Columbia River I am very concerned how this could negatively impact our small community here and the environment that surrounds us. We owe it to all the children to pass on a liveable, healthy & sustainable life for them, and the proposed Tesoro Savage pipeline-on-wheels is a path to a future of devastation. Do NOT support this project!
George	Vartanian	gvart@comcast.net	98660	WA	I don't use the Columbia River as such but to me it's a quality of life issue. The proximity to a river of historic consequence is important to the general "feel" of the area. Furthermore, there is some question as to the logistics of all the additional rail through the city and the impact on the area traffic.
Satya	vaylu	satyavaylu@gmail.com	97215	OR	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Jan	Verrinder	janowa85@gmail.com	98661	WA	Dear Governor Inslee, I am not an expert. I was in the EFSEC audience at Clark College this month and here are some of the reasons I do not want the oil trains: One of the most compelling speakers was the head of the Longshoremen who said that by unanimous vote, they do not see the 120 or so jobs that would be created worth the threat to the environment, health and livability of our community. Their opinion is that accidents will happen and they've seen them multiple times before whether it's the ship, the lengthy railway trip or something at the port. Not if an accident happens, but WHEN. The fire chief was equally compelling. Similar points. There will be chemical emissions. Daily. Prevailing wind patterns carry them straight to the nearby neighborhoods. A strong earthquake, which is always a real possibility here, would threaten the future of the Columbia River. The soil would likely liquefy, breaking the berms around storage tanks and damaged berms would not be able to contain leaked oil in that event. The Bakken oil is more combustible. It is acquired by fracking, an environmentally questionable practice as is. The field there was recently the site of a significant oil spill. Tesoro's record is very blamished. The oil is coming by rail from ND. A very long trip, and a lot of it winds along the Columbia River. Spilled oil would sink to the bottom and travel the fast current the length of the river spreading the contamination quickly and extensively. I've heard that Tesoro's projects are under-insured. What exactly would the cost of a spill be? Plus, I'd like to see our thoughts into renewable energies, not oil or coal. It's not a theory. Our climate is changing. What are we thinking? Thanks, Jan Verrinder
tracy	vieting	tracy.vieting@gmail.com	98664	WA	
Dana	Visse	danavisse@yahoo.com	97202	OR	
Richard	Vlamynck	richard_vlamynck@nebula-eda.com	99223	WA	Dear Governor Inslee, I believe that the Tesoro Savage project should be required to have insurance against accidents such as spillage, pollution, bridge collapse and if they accidentally destroy some township such as what recently happened in Canada. Respectfully, Richard.
Carlo	Voli	carlovoli@yahoo.com	98020	WA	Stop the Tesoro Savage project. Our grandchildren deserve to live, not be killed by global warming or pollution.
ROBERT	VON TOBEL	RVON_TOBEL@HOTMAIL.COM	98005	WA	
Susan	Vosburg	fgtaxsusan@gmail.com	97117	OR	
Ben	Vose	bvose@email.com	97121	OR	This project is an unforgivable threat to hundreds of miles of environment in both Oregon & Washington but worse, it's a toxic, potentially lethal danger to thousands of citizens all along the route of the project. This ill-advised, short term enterprise should NOT see the light of day.
serge	vrabec	vrabec1@aol.com	97304	OR	
Leonard	Wainstein	leonardaok@yahoo.com	98106	WA	
Sarah	Wald	sarahwald@gmail.com	40205	KY	I spent much of my time outside of work in the Columbia River Gorge. I lived this summer in Vancouver, WA. I am extremely concerned about the safety issues posed to residents of Vancouver and the pollution issues for the Gorge. Beyond that I'm very worried about the impacts to climate change of this project.
Elizabeth	Waldron, MD	ralphwaldron@comcast.net	97330	OR	We need to stop injuring our world. Greed is harming us all & our children.
Rolf & Virginia	Wallenstrom	vkng@aol.com	98683	WA	Please do not allow or support the idea of allowing the massive number of oil trains (and also dirty coal trains) to come on the BNSF rails through our WA State down along the Columbia River Gorge into Vancouver USA. The horrid Environmental harm they would do to our city and the State of Washington is not acceptable! In fact it would be a huge disaster! Thank you, R&V
Marion	Ward	mward333@q.com	98662	WA	What services are available between dams on the Columbia River east of Vancouver in the event of a derailment, oil spill, or explosion? Who will pay for these services??
Randall	Webb	lawrkw@comcast.net	97210	OR	
John	Wecker	jwecker@pacifier.com	97103	OR	
Sally	Weering	Pennysmom1@me.com	97035	OR	
Christina	Wellman	nia.wellspring@gmail.com	98650	WA	
Lawrence	Wenberg	larrywenberg@yahoo.com	96814	HI	

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSEC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you!
Rusty	West	rustywest@gmail.com	98155	WA	The Tesoro Savage project is going in the wrong direction. For the survival of Mother Earth as we know her, we need to keep all Fossil Fuel In the Ground, and switch immediately over to Renewables. The urgency of action is critical for the future of all citizens of our planet
Darrel	Whipple	dwhipple@opusnet.com	97048	OR	
Robert	Whitbeck	Bob_whitbeck@yahoo.com	98027	WA	
Robert	Whitbeck	Bob_whitbeck@yahoo.com	98027	WA	
Christopher	White	chriswh50@gmail.com	83864	ID	Dear Governor and EFSEC: I live in Sandpoint, ID, on the route of these potential coal trains. Not only are they a terrible idea for health reasons, and huge congestion here in town, but allowing them is contributing to the problem of climate change. We need to stop it here, now, or answer to future generations who will ask us why we were so foolish. Respectfully, Chris White
Nancy	White	nancypendletonwhite@comcast.net	99216	WA	
roben	white	fish_troller@yahoo.com	98686	WA	There is not enough space here. There are many reasons I do not want it.
Jeff	Whittaker	poplarguy@hotmail.com	97016	OR	I am concerned about climate change and our continued depletion of our natural habitat.
Den Mark	Wichar	deedub@webtv.net	98660	WA	BigOil(Coal/Gas) strategy is to throw at us in the Pacific Northwest so many terminal projects that we can't keep up, but they are wrong. We CAN keep up, & we will defeat ALL of them!
Will	Wiese	pickupanddelivey2002@yahoo.com	83544	ID	I am a supporter of 'sustainable, renewable' energy. I am an opponent of increased fossil fuel production and use. I believe fossil fuels have a place in future energy. Fossil fuels need to stay in the ground until they can be used without the devastating environmental consequences we are experiencing today.
Julie	Wiesner, LICSW	juliewisner@comcast.net	98685	WA	We love the Pacific Northwest because of it's beauty. This oil project will not only impact our region, but the entire planet. In a recent National Geographic magazine article, there was startling information regarding global warming, and how quickly many of port cities will be under water if we don't stop CO2 emissions. Let Washington state take a stand and be part of the solution. Leave the oil in the ground. Invest in alternate energy. We need to act YESTERDAY!! Please don't let this happen here . . . or anywhere.
Chris	Wilke	chris@pugetsoundkeeper.org	98115	WA	
Julie	Williams	juliewa@comcast.net	97330	OR	I don't need it. The next generation may need it, but we can't have it right now. If we use it all at this rate, we will destroy the life giving qualities of this planet. Let's keep carbon in the ground for a while so the earth's life-giving systems can recover.
Barbara	Wilson	wilson0752@comcast.net	97008	OR	
Mary	Wilson	smwilson@frontier.com	97114	OR	
Sharon	Wilson	thuja8@comcast.net	98115	WA	
Alan	Winter	alanyshudah@gmail.com	97211	OR	I drive out to the Columbia River Gorge a lot. Doubling the number of trains coming through would bring down the enjoyment AND make it difficult for businesses that need to cross the tracks like those going to the Bingen Industrial Park in WA.
sandra	winters	sgwinters6@comcast.net	98661	WA	We are a resourceful people capable of quickly finding environmentally safe way to fuel our energy needs. Fund those people not the huge fossil fuel companies who don't care about our towns, land and people. Now is the best time to change our course.
Karen	Wofford	kew573@gmail.com	97471	OR	
William	Wofford	labrat1a@gmail.com	97471	OR	
Gordon	Wood	transhuman@earthlink.net	98144	WA	
John and Polly	Wood	machjuan@yahoo.com	97031	OR	Risk of spills is 100% given a few years. Too much is at stake. Now you too know that so don't build the pipeline.
Karen	Wood	kwood@pacifier.com	98682	WA	As a resident of Vancouver, I'm concerned about the impact on quality of life if oil trains pass through our city on their way to storage and shipping activities at Port of Vancouver or elsewhere. I'm very concerned about accidents and potential oil spills and the impact of these trains passing through an area along Vancouver's waterfront that is proposed for redevelopment.

First Name	Last Name	Email	Zip	State	Comment: Let Governor Inslee and EFSSC know how you use the Columbia River and how the proposed Tesoro Savage project would affect you.
Pamela	Wood	pamarama2@yahoo.com	97211	OR	Continuing down the road of nonrenewable energy harms all of us, most especially the future for our grandchildren and their grandchildren. We need to act NOW to build a new way of meeting our power needs which doesn't bankrupt our children's futures, and instead leaves them a beautiful, life-sustaining planet in which to live.
Sandy	Wood	columbiagrove@msn.com	98687	WA	We live on the banks of the Columbia River on property protected for the Federally Endangered Chum Salmon. Our opposite property line is the RR tracks, and we live in fear and concern that the endless coal and oil trains will pollute the spawning site, derail and destroy us all, and continue to violate our environment. The idea of an oil terminal in Vancouver is abhorrent!
Garrynn	Woodsoog	garrynn@gmail.com	97211	OR	As a resident of a NE Portland neighborhood that is home to one of the Columbia River Gorge railroad mainlines, and as a frequent visitor to the gorge for recreational purposes, I would hate to see our infrastructure facilities used to transport more fossil fuels, contributing to global warming, to local air pollution and running a greater risk of a catastrophic spill or other disaster. Especially when our rail infrastructure is not electrified and relies on dirty diesel engines for motive power, this seems like a Very Bad Idea.
Kristy Yvonne	Wright Wright	Kristyanne005@hotmail.com whywrite@charter.net	98683 97146	WA OR	I live next to and enjoy the river. It needs to be a priority to KEEP the RIVER BEAUTIFUL and HEALTHY! Please keep this a priority for the future.
Laura	Wrixon	laurawrixon@hotmail.com	99205	WA	We need to do all we can to protect our environment and this industry does not have a good record for preventing oil spills. Don't take a chance on Washington's beautiful Columbia River (or chance hurting our planet as a whole either by encouraging these companies to continue using unsustainable energy sources!)
Marina	Wynton	marina@olivineand.com	97217	OR	The decision to allow oil trains in our neighborhood, city and river is completely immoral in so many ways. Stop the advancement of the project immediately.
Chelle	YeVington	Mmyelvington@gmail.com	97209	OR	I fish & swim in the Columbia River. Lets keep it pure.
Charles	Young	cubascotland@yahoo.com	98660	WA	ALL RISK NO REWARD: Few full time jobs created. Money will go to out of state companies. Risk of explosions unacceptable. (read about Lac-Megantic Quebec) Risk of spill in Columbia River unacceptable. Lowering of property value. Tesoro has a poor environmental record. BIG OIL NEVER ACCEPTS TRUE COST OF CLEANUP!
Nancy L	Young	hopesnana2@gmail.com	92637	CA	I don't personally use the Columbia River, but I have family members in Oregon who do. Coal is bad old news. We need modern solar voltaic and solar thermal technologies to replace fossil fuels and stop contributing to global warming.
Sue	Zerangue	zerangue@hotmail.com	97103	OR	
Lauren	Zimmermann	renzimm@gmail.com	98663	WA	Even if not a single drop of oil ever spilled in transit, the pollution from the increased trains themselves are enough to dislike this proposed project. Why allow these filthy technologies into our community? Washington could lead the way in green technologies and refuse to work with companies like this. I don't need cheaper energy if it means less healthy rivers and air.
Jasmine	Zimmer-Stucky	jasmine@columbiariverkeeper.org	97211	OR	
Ronald	Zito	ronzito4@gmail.com	98664	WA	
Mike	Zotter	zottermi@yahoo.com	97214	OR	Gov. Inslee, I campaigned for you in 2000 because you understood the balance between jobs and healthy communities/our environment. If you allow this project to happen, you will spit on those who got you into office to speak for the people and our environment. This project is a joke. Stop it now. The Columbia is polluted enough from the shipping industry and Hanford. No more pollution.
Adrienne	Zuckerman	Adriennez@gmail.com	98605	WA	Please stop do everything you can to protect citizen health. Stop this project.



**UTC)**

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**From:** Bill Brake <williamb98685@aol.com>  
**Sent:** Wednesday, December 18, 2013 4:28 PM  
**To:** EFSEC (UTC)  
**Subject:** TESORO SAVAGE COMMENTS - WILLIAM A BRAKE PE  
**Attachments:** TESORO SAVAGE BRAKE.docx

**Categories:** Red Category

Stephen Posner,

Attached are my comments on the Proposed Tesoro Savage Crude Oil Terminal Project in Vancouver, Washington.

I read all 2,190 pages of the proposal and offer constructive comments.

William A. Brake  
3407 NW 116th Way  
Vancouver, WA 98685  
Email - [williamb98685@aol.com](mailto:williamb98685@aol.com)  
H - 360-574-9735  
C - 360-600-8720

December 18, 2013

Stephen Posner, EFSEC Interim Manager

Energy Facility Site Evaluation Council

P.O. Box 43172

1300 South Evergreen Park Drive SW

Olympia, WA 98504-3172

Email – [efsec@utc.wa.gov](mailto:efsec@utc.wa.gov)

SUBJECT: Comments on Proposed Tesoro Savage Vancouver Energy Distribution Terminal

Application No. 2013-01

Docket No. EF-131590

I attended the public meeting in Vancouver Washington on October 28, 2013 and I am expressing my views only as a private citizen and not affiliated to any organization or special interest group either for or against the proposed Tesoro Savage Vancouver Energy Distribution Terminal Project. I was able to speak briefly to the panel at this meeting. My background as a Bachelor of Science in Chemical Engineering and several courses towards a Masters of Engineering Degree offers credibility to my comments.

I have over 35 years of industrial experience working in the natural gas business as an Environmental Engineer, Process Engineer, Safety Engineer as well as a management position responsible for a workforce of 115 employees. As a Registered Professional Engineer in the State of Texas, I am recognized by my peers to uphold the codes and regulations of engineering.

We retired in June 2005 and moved to Vancouver Washington living in the NW Community of Felida, which is 6.5 miles and 13 minutes by road or 3.75 miles line of site distance from the proposed Tesoro Savage Facility.

I offer these comments on the proposed Tesoro Savage Vancouver Energy Distribution Terminal Project.

Sincerely,

William A. Brake P.E.

3407 NW 116<sup>th</sup> Way

Vancouver, WA 98685

H 360-574-9735

C 360-600-8720

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TESORO SAVAGE BRAKE.doc

## Proposed Tesoro Savage Vancouver Energy Distribution Terminal Project

360,000 Barrels per Day (15,120,000 Gallons)

### Areas of Concern

- **SAFETY** - Tesoro is the same company that was fined \$2.39 million by Washington regulators, the largest penalty for workplace safety violations in the history of the state, for an April 2, 2010 explosion at its 120,000 Barrels per Day Anacortes Refinery that **killed seven people**. Tesoro was cited for 39 “willful” violations and five “serious” violations of state workplace safety and health regulations. Is this a risk worth taking?
- **SAFETY** - Tesoro is the same company that had an oil pipeline leak discovered by a farmer in a North Dakota wheat field that for at least 12 days **leaked 20,600 Barrels** (865,200 Gallons) of Bakken Crude Oil on September 29, 2013. Is this a risk worth taking?
- **SAFETY** - Tesoro defines Midwest North American Crude Oil in their Application as six grades of Crude Oil that ranges from Heavy Canadian **Tar Sand Oil**, to **3.2 % Sour Crude Oil**, to highly volatile North Dakota **Bakken Crude Oil**. Some of the oil is so heavy that it sinks in water, others are sour with hydrogen sulfide that if released will immediately kill unprotected people and responders and the Bakken Crude Oil is blamed for the rail car explosions, fires, and 47 deaths in Lac-Magantic Quebec, Canada on July 2, 2013. Is this a risk worth taking?
- **COMMERCE** - Tesoro paints a broad brush on delivery of the Crude Oil by ships **primarily** to United States West Coast Refineries but is seeking a change on November 6, 2013 in the current United States rule passed in 1975 (38 year rule) that **prohibit export of Crude Oil**. This would open the potential for Crude Oil export to Canada and Pacific Rim Countries. Permit regulations could specify that only US Crude Oil be delivered to US Flagship and Crewed Marine Vessels. Is this a risk worth taking?
- **TRANSPORTATION** - Tesoro proposes to expand the rail yard to accommodate 4 unit trains per day of crude oil transported in the **design flawed DOT-111 rail cars**. Each Unit Train will be up to 110 Rail Cars and be a **Pipeline on Wheels** transporting 90,000 Barrels per Day (3,780,000 Gallons). Total daily delivery at full build out would be 360,000 Barrels per Day (15,120,000 Gallons). This is equivalent to an 8 inch pipeline filled with oil from the Bakken Oil Terminal at Trenton North Dakota to Vancouver Washington a distance of 1,210 miles. More study on alternate transportation is needed.
- **TRANSPORTATION** – The Unit Trains potentially could be as high as **3,584 trains annually** with 110 rail cars per train considering both full and empty traversing the State of Washington rail lines. A total of **197,100 rail cars at 667 Barrels Each** (28,000 Gallons) yearly is a large exposure to accident. An additional 197,100 empty rail cars return on the same route annually. Is this a risk worth taking?
- **SAFETY** - Tesoro proposes to have 6 Crude Oil Storage Tanks with each tank to be 48 feet tall and 248 feet in diameter with a shell capacity of 380,000 Barrels and a working capacity of 340,000 Barrels. The combined **inventory could be 2,040,000 Barrels (85,680,000 Gallons)**. Is this a risk worth taking?

- **TRANSPORTATION** - Tesoro proposes to have two marine loading berths modified for ships between 350,000 and 700,000 Barrels each resulting in a ship being loaded once per day. This would result in potential **increase of 720 ships per year** both full and empty on the 100 mile Columbia River from Vancouver Washington to the Pacific Ocean. What is the physical capacity of the Columbia River with such a large increase in marine traffic?
- **COMMERCE** – The Tax Benefits of this \$110 Million Dollar Project are \$7.67 MM to Washington State, \$2.09 MM to Local Governments, and \$1.55 MM annually in 2013 dollars in Property Tax. With **governmental revenue at \$0.057 per Barrel of Crude Oil**, is this a risk worth taking?
- **COMMERCE** - The Port of Vancouver will receive \$45 MM for a ten year surface lease on the proposed site. If an Environmental disaster occurs, then Tesoro – Savage walks off and the **Port of Vancouver is liable for the long term cleanup**. Is this a risk worth taking?
- **COMMERCE** – The \$110 MM project and will support over 200 Construction workers and a **staff of 110 Employees** at full build out. Is this project the best industry to create jobs?
- **COMMERCE** – There are 438,290 people in Clark County in 2012 and the **Study Area** of the Portland – Vancouver Metropolitan area has in 2012 had **2,810,710 people**. We have a voice on this project and want to be heard.
- **SAFETY** - When in full use the **Fire Water pumps will flow 4.32 Million Gallons per Day** which is 7.85 % of the one day peak of the City of Vancouver Water System of 55 Million Gallons. A major fire at this facility would use water **for several weeks**. Is this a risk worth taking?
- **SAFETY** - The fire water pumps are not self-contained and require **35 gallons per minute water** for cooling that goes **to a drain**. 30 minutes testing is 1,050 gallons and a full fire scenario is 50,400 Gallons per Day. NFPA requires the pumps to be self-supported without external utility requirements for engine and oil cooling. This item cannot be compromised.
- **SAFETY** – The **Hydrostatic Test Water is estimated at 20 MM Gallons** and is 36 % of the City of Vancouver System Peak Load of 55 MM Gallons per Day. **Better water conservation and reuse is needed** and should be specified in the permits for this project.
- **SAFETY** - The **Flood Level is identified at 30 Feet** and will flood the facility. Berth 13 and Berth 14 and the Control Room and E House and Motor Control Center will all be under water. Tesoro Estimates that there is a 1 % chance of this happening in any given year. **The City of Vancouver lists Flood Categories as follows: Action 15 ft, Flood 16 ft, Moderate 20 ft, and Major at 25 ft. The Tesoro Application doesn't worry until it is too late**. Is this the best site for the proposed Terminal?
- **COMMERCE** - With all the tankage in place a simple modification to the proposed permits will **allow a 100,000 Barrel Per Day Refinery to be built**. It will be the **first Grass Roots refinery project in over 35 Years in the US**. With six storage tanks they could be configured with three Feed Stock, one Gasoline, one Diesel, and one Jet Fuel. **With such naïve and gullible politicians, Vancouver could become the Oil Capital of the West**.
- **COMMERCE** - A case of **Do Nothing** needs to be investigated in the analysis of alternatives. The Bakken Crude Oil will go to Canada through existing pipelines or rail cars. Alternately, the Bakken Crude will go to existing US Terminals by Pipeline or Rail or Barges. **No New Terminal is**

*needed*. With North Dakota exceeding one million barrels production per day in the month of December 2013, the ***product is flowing now without a Vancouver Terminal***.

- **COMMERCE** – Tesoro ***applies for a waiver on Crude Oil Sales outside the United States on November 7, 2013***. Tesoro began publicly wanting the legal ability to export the Vancouver Terminal Ships to Foreign Ports. The Merchant Marine Act of 1920 known as the “Jones Act” details the oil transported by water between US Ports will be carried on US flag ships, constructed in the US and owned and crewed by US citizens. ***This is a reason to void the proposal***.
- **SAFETY** - The proposed ***Tesoro Facility is in the Flight Path*** of both the Vancouver Pearson Field and Portland International Airport (PDX). At a minimum the need for lighting and further study of the Marine Vapor Combustion Unit and Tank Farm Combustion Unit is needed. These items are within the 1 Degree Angle of Approach at these airports. An upset process condition could emit ***burning hydrocarbons several hundred feet in the air*** and impact the safety of commercial and private airplanes.
- **SAFETY** - The marine loading is at a rate up to 40,000 Barrels per Hour and has automatic shutdowns that respond within ***30 seconds***. This means that once the shutdown is activated 333.33 Barrels or ***14,000 gallons is lost to the ground, waters or is engulfed in a catastrophic fire*** scenario. Where does this loss go and even the best management practice ***design is NOT adequate***.
- **SAFETY** - ***Emergency response is completely shut off on NW Lower River Road*** and Highway 501 with the six storage tanks (85,680,000 gallons) located along the highway frontage in the scenario of an emergency situation involving the tank farm. This could be an Over flow, H2S, Personnel Injury, Fire, Explosion. There ***is no alternate access*** of a farm road, dirt path, water access to safely handle the situation. An alternate path is needed off site of this facility.
- **SAFETY** – The Tesoro Site is to be built on ***“Fill Material”*** and is an unstable mix of fill, dredging operations and will result in settlement. The area is identified as moderate to high liquefaction zone. My experience in industrial projects built on fill material at an energy facility is between 1 and 4 inches of settlement in a 10 year period stressed piping and failures at flanged piping components. This ***is not a safe site to build a major industrial complex***.
- **SAFETY** – The ***Clark County Jail Work Center is a 224 bed minimum security facility*** opened in the year 2000 and ***will be in a zone requiring evacuation multiple times*** due to H2S Alarms, LEL alarms, Fire, Explosion, Leak or other process condition. The Proposed Tesoro Savage Crude Oil Terminal is extremely dangerous and unpredictable and could result in catastrophic consequences.
- **SAFETY** – The ***Vancouver Fire Department is rated a Class 4 Service*** with Class 1 being the best and Class 10 the most deficient. The department was ***downgraded in October 2002*** for deficiency in Staffing, Fire Prevention and Marine Response. ***Twelve years later, there are minimal changes*** noticeable to the public that would support a world class oil terminal facility. Even the Portland Fire Department is limited in resources when the Thunderbird Motel burned next to the Interstate 5 Bridge and took every resource available and the facility burned for a week. Is this a risk worth taking?

- **SAFETY – Fire Water Pump #1 is located within the Storage Tank Farm diked area** and will not be accessible or functional in an emergency situation. **This is not a risk worth taking.**
- **SAFETY –** The proposed personnel LEL monitors (Lower Explosive Limits) protects the employees from explosive hazards. With **over 100 different chemical components in the Crude Oil**, the LEL monitors are focused only on light end hydrocarbons and are not specific for the more dangerous chemicals such as benzene, xylene, toluene and others. More study is needed and **both fixed and portable LEL monitors** should be a part of the facility design.
- **SAFETY –** All business, residential, and recreational areas west of the proposed Oil Terminal Facility are **cut off in the scenario of a fire in the Storage Tank Area. Far West Steel, The Clark County Jail Work Center, The 350 MWH Power Plant, Suburu, Tesoro, Waste Connections, Williams Pipeline, Frenchman's Bar Recreation Area, Vancouver Lake Recreation Area, and local farms, residents and house boat living areas are trapped** for many days until river escape to Oregon is started. There is no road escape routes for these when the only road is closed. Alternates are needed.
- **TRANSPORTATION –** This facility will **load on average one ship per day** or 365 ships annually. With the current Columbia River Traffic at 500 Ships annually, this is **a 73 % increase** over existing Ships and is the river capable of this change and be done safely.
- **TRANSPORTATION –** This facility will add 365 Ships annually plus the existing 500 ships currently serving the commercial markets will total 865 ships on the Columbia. This means that **42 % of all commerce on the river is crude oil** and makes the Columbia River in a class **like the Houston Ship Channel** which is not favorable to people or business.
- **SAFETY –** No part of the Tesoro Savage Proposal **addresses Ballast Water** on the Ships. What is the Origin, Composition and disposal method for the Ballast Water and its impact on the River systems quality? To **dump** the Ballast Sea Water to the **Vancouver City Waste Water Treatment Plant would kill the useful bacteria** in the processes by the large influx of Salt Water. More Study is needed.
- **TRANSPORTATION –** The Facility proposes 7 to 8 Longshoremen to load the Ships at the marine dock. The Local **Longshoreman's Union** Voted in October 199 to 0 against **supplying manpower for this facility as it is too dangerous.** Where does qualified, skilled, and consistent ship loading manpower come from. This could be a deal killer for this project.
- **SAFETY –** The **unloading of Rail Cars** is one of the most **dangerous** activities in the Petroleum Business. The Crude Oil product is unpredictable in Pressure, Composition, and Temperature and can lead to serious and often fatal accidents by using inadequately trained and unskilled workforce on this repetitive function. With 394,200 rail cars per year the potential for an accident is extraordinary. For example, a rail car loaded at – 40 F in Trenton North Dakota arrives in Vancouver Washington a day later at 60 F and does not have steam coils and is frozen and will not flow. **Creative methods** such as applying 100 # air to the rail car, external steam hoses on rubber fittings, and other similar **dangerous thinking** will result in both a leak and **potentially a fatality.** Is this the best product for Vancouver?
- **TRANSPORTATION –** The Columbia River Bar is where the River enters the Pacific Ocean is known as the **"Graveyard of the Pacific"** due to the high number of ships that sunk from the

treacherous water currents. Is an **additional 720 Ships per Year** of Crude Oil and Emptys necessary at this location?

- **COMMERCE** – The **Total Lease Fees**, Construction Taxes, and Property Tax total **\$75 MM** for a 10 Year Period and the Tesoro Savage Facility will **handle 1,314,000,000 Barrels of Crude Oil**. The revenue Generated **is \$0.057 per Barrel or \$38.05 per Rail Car** on a product that is valued at \$100.00 per Barrel. Is this the right thing to do for the Pacific Northwest?
- **SAFETY** – The Thermal Oxidizer related to the Storage Tanks is not located in a safe area. It is too close to the public access road and an upset condition will result in **offsite thermal exposure to the general public**. My experience with a flare at a natural gas facility in New Mexico in 1995 identified during an upset the door of the control room was 165 F and a red towel was placed on the door knob to protect personnel from burns. This was at a distance of 290 feet from the flare to the control room. The facility siting during upset conditions needs further study.
- **ENVIRONMENT** – Discussions in the Columbian Newspaper the summer of 2012 indicate discussions between Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) on methods to increase traffic in the Columbia Gorge Common Areas of Washington and Oregon. This discussion should be a basis of changing the Tesoro Savage Project from A State Environment Protection Assessment (**SEPA**) to a Federal National Environment Protection Assessment (**NEPA**) raising the standards to a **higher level of review**. This review should include the States of North Dakota, Montana, Idaho, Washington, and Oregon for Rail Transportation. The States of Washington, California, and Hawaii should be included in a review of Ship Terminals. Common sense says that Oregon is one mile away from the Vancouver Washington Site and it should be a Federal review and not a state review.
- **SAFETY - Loading hoses** used on the Rail Cars and Ships are some of the most dangerous piping components in the energy industry. The repetitive connecting and disconnect as well as external bending, flexing ,and pinching results in failure rate way above common sense. **Strict inspection, testing, and time based replacement should be considered mandatory** for this project and part of the permit for the facility.
- **SAFETY** – H<sub>2</sub>S is a very deadly chemical part of the energy industry. H<sub>2</sub>S is detectable at 50 ppb, deadly at 500 ppm and is heavier than air and remains low to the ground. Tesoro indicates six grades of **crude oil from less than 1 ppm H<sub>2</sub>S to 32,000 ppm H<sub>2</sub>S**. What is the Radius of Exposure for the worst case scenario of a release at 32,000 ppm H<sub>2</sub>S at a rail car hose with a steam heated hot rail car? Does this **Radius of Death extend into offsite nearby facilities and public roads**? Does this impact the new Vancouver residential and commercial waterfront development?
- **ENVIRONMENT** – The **Thermal Oxidizer and Marine Vapor Combustion Unit are the weak link** in this project. With only single units and redundant, the facility is shutdown until repairs or replacement is completed. My experience in the energy industry have seen cracks and burned out shells at the base of the Thermal Oxidizers making the units inoperable. The **unpredictability of the Crude Oil** compared to refined products creates many new unexpected dangers. Are back up trailer mounted units available within hours until repairs are completed?

- **COMMERCE** – Potential **23,000 Tons per Day Down River and 6,850 Tons per Day up River STOPS** if a Rail Car Incident occurs along the Columbia River from Vancouver Washington going east. With approximately 175 miles of rail traffic adjacent to the Columbia River this is a major issue that needs further study for this project.
- **TRANSPORTATION** – With the **BNSF Columbia River rail line operating at 70 % of capacity** with **26 to 30 trains** daily, is there capacity for the **20 Trains per Day** for the Gateway Pacific Coal Terminal at Bellingham, **20 Trains per day** for the Millennium Bulk Terminals at Longview, and the **8 trains per day** for the Tesoro Savage Crude Oil Terminal at Vancouver? More Study is needed.
- **TRANSPORTATION** – **Three routes exist for rail traffic going west in Washington State** on BNSF track. (1) The Stevens Pass line is heavily used, operating at 123 percent of practical capacity, and serves as BNSF's primary route for transcontinental double-stacked intermodal trains. The significant capacity constraint on the Stevens Pass line is the 7.8 mile long Cascade Tunnel, the longest railroad tunnel in the United States. The Cascade Tunnel requires mechanical means to vent the hot exhaust gases from trains – this reduces capacity of the tunnel to approximately one train per hour. (2) The Stampede Pass route operates at approximately 60 percent of practical capacity. However, this line cannot be used to alleviate congestion on the Stevens Pass route because the Stampede Tunnel, a steep, 2-mile long tunnel that has a ceiling which is too low to accommodate the height of double-stacked intermodal trains. (3) The Columbia Gorge is the overflow for freight that cannot go through Stevens Tunnel or Stampede Tunnel. It is operating at 70 % of capacity and involves 175 miles of Columbia River Frontage. With the infrastructure to expand the rail lines extremely slow and capital intensive, moving oil by rail is a tremendous challenge. More **study is needed prior to committing to over 100 trains per day** for all the Coal by rail and Oil by rail proposals.
- **ENVIRONMENT** - If there was an **oil spill in the Puget Sound** of Washington it is estimated clean up could cost **at least \$10.5 Billion Dollars** to clean up. Is it worth the risk on the Columbia River?
- **COMMERCE** – **Twelve Oil by Rail projects are planned or operating in the Pacific Northwest.** They are Ferndale – BP and Phillips 66, Anacortes – Shell and Tesoro, Tacoma – Phillips 66 and US Oil, Grays Harbor – US Development, West Way, Imperium, Clatskanie – Global Partners, and Vancouver – Tesoro-Savage and Nustar. If all are built this is **720,000 Barrels per Day of Crude Oil** and 20 miles of trains will be on Northwest Rail Tracks. **Are we prepared?**
- **COMMERCE** - **Vancouver** is listed as Number 96 in the **top 100 livability list for the nation** in a Summer 2013 ranking. Is a Crude Oil Terminal the right thing to do?
- **SAFETY** - Request State look at **disaster plans for all communities** from the state border to the state border along the route of the crude oil. **For example**, there are **31 communities** along the Columbia River from Vancouver to Whitcomb a distance of **175 miles**. Are we prepared?
- **COMMERCE** - Reality that a **national energy and environmental policy will not happen** so **burden** on this Oil Terminal Project is **on the State of Washington Review Process** to accept, modify or reject this proposal.



- **ENVIRONMENT** - Tesoro stated that *how fortunate* it was that the 12 day and **20,000 BBL Oil Pipeline Leak** in October 2013 went to an *impervious clay layer of soil* in North Dakota and not to a river or other waterway. This is equivalent to 30 of the potential 197,100 full rail cars for the Vancouver Project. Are we prepared for land or water environmental disaster?
- **ENVIRONMENT** - The *Columbia River Gorge is rated number six in the world* by the National Geographic Society as a *sustainable scenic resource*. *Are we prepared now for what will happen* by hasty decisions and poor judgment?
- **TRANSPORTATION** - *BNSF had 292 derailments in 2011*. When will it be our turn?
- **TRANSPORTATION** - *Pasco Washington had a 30 car coal train derail recently* and if it was oil cars it would be disastrous. Are we prepared?
- **TRANSPORTATION** – *Phillips 66 Company* in December 2013 *purchased 2,000 new DOT 108 Rail Cars* for delivery in the summer of 2014 for movement of Bakken Crude Oil to its refineries. This is equal to 20 unit trains of 100 cars each. *Why are the outdated and dangerous DOT 111 Rail Cars even being discussed?*
- **SAFETY** – Bakken Crude Oil is the only crude proposed that carries a NFPA rating of 2 For Health, **4 For Flammability**, and 1 for Reactivity of the six crude oils proposed for the Tesoro Facility. It is highly unpredictable. *Some literature sources indicating 15 to 30 % volatility*. Why is this project needed in Vancouver?
- **ENVIRONMENT** – The application is being processed under the provisions of RCW 80.50 and WAC Title 463, which create an *Energy Facilities Site Evaluation Council (EFSEC)*. EFSEC has the responsibility to review and recommend to the Governor; Governor has the sole authority to determine if a project is allowed to proceed. There are *two distinct aspects of the review: (1) SEPA compliance and (2) Certification the proposal can meet local regulations and standards*.
- **SAFETY** – A scenario with *One Storage Tank with 340,000 Barrels of Crude Oil on fire will require ten storage tanks of water converted to steam to extinguish*. This is 144,000,000 gallons of water and with the fire pump operating at 3,500 gallons per minute *will take 29 days to consume all the available crude oil*. This scenario emphasizes the extreme danger of Crude Oil and that unless advanced firefighting techniques with foam are employed, the fire will ultimately be allowed to burn itself out. This scenario needs further study.
- **SAFETY** – A scenario *with one rail car with 667 Barrels of Crude Oil on fire* will require ten rail cars of water to extinguish. A water requirement of 282,000 gallons is not readily available in the terminal and especially any place along the 1,200 mile rail route and it will require **35 tankers of water to extinguish the fire**. A scenario similar to the Lac Magnetic in Quebec Canada on July 6, 2013 that killed 47 people and burned over 40 buildings is plausible. Further Study is needed on the *emergency response capabilities of first responders along the rail line corridor*.
- **SAFETY** – *98,600 Cords of Wood equals 348,000 Barrels Crude Oil* on a common BTU Basis. One tank of Crude Oil is equal to **54 tanks of wood** with each tank being 250 feet in diameter and 48 feet tall. *Are we prepared with resources to extinguish a fire* of this size and complexity?
- **SAFETY** – In the first ten year period the *Tesoro Facility will handle 1.314 Billion Barrels of Crude Oil*. If all that *energy is used to boil water*, that energy equivalent is *equal* to the amount of water in the *Columbia River from Vancouver Washington to the Pacific Ocean a distance of 100 miles*.
- **SAFETY** – In a *ten year period 3,942,000 full and empty rail cars* will travel the 1,210 miles from Trenton, North Dakota to Vancouver Washington. According to the American Association of

Railroads statistics **91 of these rail cars with hazardous shipments will not safely make it** to the destination. Is this a risk worth taking?

- **SAFETY** – In a ten year period **17,918 Trains of Crude Oil** will go through **our neighborhoods**. Is this a risk worth taking?
- **SAFETY** – In a **ten year period 112,190 minutes of wait time related to crude oil trains only** is consumed **at each and every Grade Crossing** of rail tracks. This is cutting off communities, schools, churches, industries, and people from **lifesaving resources of Police, Fire, and Medical**. Is this a risk worth taking?
- **SAFETY** – In a **ten year period 1,971,000 rail cars will be connected** to off load the crude oil product. How many of these will be done **unsafely due to inexperience, carelessness, operation procedural deficiencies, maintenance procedural deficiencies and result in a catastrophic incident**. Is this a risk worth taking?
- **SAFETY** – The **Project timeline** is as follows: Permits 8-30-13 to 8-19-14 (354 days), Governor Review 8-20-14 to 10-14-14 (55 Days), and Construction 10-15-14 to 7-31-15 (289 Days) for a total of 698 Days. The **clock is ticking and 110 days has already gone by** leaving only 588 days till Start up.

TESORO SAVAGE ENERGY DISTRIBUTION TERMINAL		
	Barrels per Day	
<b>360,000</b>		
	Barrels Per Year	
131,400,000		
	Barrels for 10 Years	
1,314,000,000		
	Barrels Per Hour	
15,000		
250	Barrels Per Minute	
4.17	Barrels per Second	
	Gallons Per Day	
15,120,000		
	Gallons Per Year	
5,518,800,000		
	Gallons for 10 Years	
55,188,000,000		
	Gallons Per Hour	
630,000		
	Gallons Per Minute	
10,500		
175	Gallons Per Second	
	28,000 Gallons / Rail Car	
<b>540</b>	Full Rail Cars Per Day	

197,100	Full Rail Cars Per Year	
1,971,000	Full Rail Cars Per 10 Years	
22.50	Full Rail Cars Per Hour	
0.38	Full Rail Cars Per Minute	
0.01	Full Rail Cars Per Second	
<b>540</b>	Empty Rail Cars Per Day	
197,100	Empty Rail Cars Per Year	
1,971,000	Empty Rail Cars Per 10 Years	
22.50	Empty Rail Cars Per Hour	
0.38	Empty Rail Cars Per Minute	
0.01	Empty Rail Cars Per Second	
	110 Rail Cars / Unit Train	
4.91	Full Unit Trains Per Day	
1,792	Full Unit Trains Per Year	
17,918	Full Unit Trains Per 10 Years	
0.20	Full Unit Trains Per Hour	
	Full Unit Trains Per Minute	
	Full Unit Trains Per Second	
	4 Locomotives Per Unit Train Operating	
19.64	Full Locomotives Per Day	
7,167	Full Locomotives Per Year	
71,673	Full Locomotives per 10 Years	
	1 Locomotive Per Train Operating	
4.91	Empty Locomotives Per Day	
1,792	Empty Locomotives Per Year	
17,918	Empty Locomotives Per 10 Year	

24.55	Total Locomotives Per Day	
8,959	Total Locomotives Per Year	
89,591	Total Locomotives Per 10 Years	
6892	Train Length in feet	
67,667	Train Feet Per Day Full and Empty	
24,698,422	Train Feet Per Year Full and Empty	
12.82	Train Miles Per Day	
4,678	Train Miles Per Year	
30.74	Daily Wait Time Minutes at Crossing @ 25 MPH	
11,219	Yearly Wait Time Minutes at Crossing @ 25 MPH	
186.98	Yearly Wait Time Hours at Crossing @ 25 MPH	
2.1%	Wait Time Percent	
99.9977%	AAR and BNSF Rail Car Safety	
0.0023%	AAR and BNSF Rail Car Unsafe	
1,080	Rail Cars Per Day Total	
394,200	Rail Cars Per Year Total	
3,942,000	Rail Cars Per 10 Years Total	
0.024840	Rail Cars UnSafe Per Day	
9.066600	Rail Cars UnSafe Per Year	
90.666000	Rail Cars UnSafe Per 10 Years	

**From:** Erin E. Herlihy <eherlihy@martenlaw.com>  
**Sent:** Wednesday, December 18, 2013 3:42 PM  
**To:** EFSEC (UTC)  
**Subject:** Tesoro-Savage Energy Distribution Terminal, Docket EF-131590, SEPA Scoping Comments  
**Attachments:** 2013-12-18 Letter to EFSEC - Scoping Comments (00392235xA9955).pdf  
**Follow Up Flag:** Follow up  
**Flag Status:** Completed  
**Categories:** Red Category

Dear Mr. Posner,

The attached comments are submitted on behalf of Barry Cain and Columbia Waterfront LLC regarding the scope of the SEPA review required for the above-referenced Tesoro-Savage oil terminal. These comments are also being submitted via U.S. mail.

Thank you.



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THE  
WATERFRONT

December 18, 2013

Via email to [efsec@utc.wa.gov](mailto:efsec@utc.wa.gov) and U.S. Mail

Stephen Posner  
Interim EFSEC Manager  
Energy Facility Site Evaluation Council  
P.O. Box 43172  
1300 S. Evergreen Park Dr. SW  
Olympia, WA 98504-3172

RE: Tesoro-Savage Energy Distribution Terminal, Docket EF-131590  
SEPA Scoping Comments

Dear Mr. Posner,

The following comments are submitted on behalf of Columbia Waterfront LLC on the scope of the State Environmental Policy Act ("SEPA") review required for the proposed Tesoro-Savage Energy Distribution Terminal, a proposed crude-by-rail oil handling, storage, and shipping facility ("Tesoro-Savage Facility"). We thank you for extending the deadline for submitting comments.

Columbia Waterfront LLC is the developer of a new waterfront community, The Waterfront, scheduled to break ground in Vancouver, Washington in early 2014. The Waterfront is located a less than 2 miles east of the proposed distribution terminal and immediately adjacent to the Port of Vancouver's spur rail line, which Tesoro intends to use to deliver some 360,000 barrels of oil per day to the proposed oil handling facility. See Exhibit A (General Vicinity Map).

We are deeply concerned about the Tesoro proposal to construct a new facility to receive crude oil by rail, store it on site, and load it on marine vessels for shipment to West Coast refineries and possibly overseas. The proposed facility would allow for 2.16 million barrels of oil to be stored on the banks of the Columbia River, posing significant risks to the health, welfare and economic future of Vancouver and its residents. A project of this magnitude and importance deserves careful review and consideration of the wide range of potential impacts it may have on the natural and built environment. This comment letter focuses primarily on potential impacts from the proposal on the built environment. A list of additional impacts that should also be analyzed in the EIS, including impacts to the natural environment, is also included as Exhibit F. The EIS should assess available means to mitigate these impacts, and the Council should condition any recommendation for approval on the effective mitigation of all significant environmental impacts. WAC 197-11-660. To the extent that mitigation measures are ineffective

in addressing the impacts of the proposal, the Council should recommend denial of Tesoro's application. *Id.*

## **I. Background**

### **A. The Waterfront Project**

The Waterfront project, and along with it the public goals for a sustainable future for downtown Vancouver, are directly threatened by the Tesoro proposal. The Waterfront will transform a Brownfields area --- the former Boise Cascade mill site --- into a vibrant urban community.<sup>1</sup> Envisioned as a live-work-play community, The Waterfront will reclaim a significant piece of the city landscape and reconnect Vancouver to its roots along the banks of the Columbia River. The Waterfront will include a new 7 acre Waterfront Park on land to be dedicated to the City by Columbia Waterfront LLC, which has also committed to providing initial park improvements including a waterfront trail linking to and extending the existing Columbia River Renaissance Trail. See Exhibit B (The Waterfront site location map). The project consists of up to 3,300 residential units of several types to create a socially and economically diverse community; more than 800,000 square feet of office space; 250,000 square feet of retail space including restaurants, specialty shops and services to support residents and visitors; and a 200 unit hotel. Exhibit B. The community is designed to be friendly for pedestrians and bicycles and will provide convenient access to downtown Vancouver and mass transit.

Situated between downtown Vancouver and the Columbia River, the project site comprises more than 32 acres, including 28 acres owned by Columbia Waterfront LLC and 4 acres leased from the Port of Vancouver.

Columbia Waterfront LLC acquired the property in 2008 and worked closely with the City and Port to create the master plan for development.

The Waterfront will reshape Vancouver's identity and aid in the ongoing revitalization of downtown, while the property, long closed to the public, will be reopened for all to explore. See Exhibit C. In considering approval for The Waterfront master plan in 2009, City staff found the development to be in compliance with the City's Comprehensive Plan and "that the public interest, health, safety, and general welfare will be served" by development of The Waterfront project.<sup>2</sup> The City Council approved the master plan for The Waterfront in December 2009.<sup>3</sup>

#### *1. Economic impact from waterfront redevelopment*

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<sup>1</sup> More information regarding The Waterfront is available at: <http://thewaterfrontvancouverusa.com/>.

<sup>2</sup> City of Vancouver, Staff Report and Recommendation to the Planning Commission, Vancouver Waterfront Development, PRJ 2008-02040 (Oct. 27, 2009).

<sup>3</sup> Ordinance No. M-3936.

The Waterfront will be an economic engine for the City and Clark County. The construction of The Waterfront project is estimated to generate over 4,580 direct full time equivalent (FTE) jobs over the construction period, paying an estimated \$244 million in labor income (\$53,400 per employee), and contributing \$318 million in value-added output. Johnson Economics, Estimated Economic and Fiscal Impacts of the Tesoro-Savage Facility on The Waterfront Vancouver Development and Downtown Vancouver 6 (Dec. 2013) (Exhibit D). Indirect and induced impacts from construction activities will create an additional 2,600 FTE jobs, \$108 million in labor income, and \$187 million in value-added output, with the total impact on Clark County from construction activities totaling over \$927 million. Exhibit D.

Once completed, ongoing business activity at The Waterfront will generate an estimated 1,364 direct jobs, contributing \$64.8 million in annual labor income and \$59.6 million in value-added output to the Clark County economy. Indirect and induced impacts are expected to create an additional 679 permanent jobs paying \$25.9 million in labor income. The total annual output associated with the ongoing operations at The Waterfront is estimated to be in excess of \$185.5 million per year and be sustained into the foreseeable future. Exhibit D.

Economists have also estimated that The Waterfront will generate over \$31 million in tax revenues during the construction period, while recurring tax revenues are estimated at \$6.5 million per year including property taxes, lodging related taxes, sales taxes and employee-based business taxes. The net present value of these recurring tax revenues is estimated to be approximately \$96 million. Exhibit D.

## *2. Timing of waterfront redevelopment*

The development of The Waterfront is not speculative or remote. The EIS must therefore consider the likely impacts of the Tesoro proposal on The Waterfront development. The Waterfront master plan was approved in 2009, and the project is proceeding with permitting, having obtained preliminary subdivision approval as well as City approval of the shoreline management permits for the park. The City is currently finishing the Waterfront Access Project, a \$45 million public-private investment that will provide ready street and sidewalk access to The Waterfront from the City's existing downtown core along Esther and Jefferson Streets. With the Waterfront Access Project and associated infrastructure improvements scheduled for completion by the end of 2013, on-site road-building at The Waterfront is scheduled to begin in the summer of 2014, funded by a combination of state Transportation Improvement Board grant funds, City investments, and developer contributions. Building construction will begin in 2015.

### B. The Tesoro Proposal

Tesoro Savage Petroleum Terminal LLC ("Tesoro") has proposed to construct and operate a facility at the Port of Vancouver to receive crude oil by rail, store the oil on site, and load up to



an average of 360,000 barrels per day onto marine vessels for delivery primarily to West Coast refineries. Tesoro Application for a Site Certificate (“ASC”) at 2-86. At build-out, as many as six loaded unit trains per day, each approximately 7,800 feet in average length (1.47 miles) and containing approximately 100 to 120 tank cars of crude oil, would be delivered to the facility by rail. ASC at 2-91, 4-431. Thus, as many as 12 trains per day would travel through downtown Vancouver and along tracks immediately adjacent to the Columbia River and The Waterfront. See Exhibit B. Up to 2.16 million barrels of oil, or 90.72 million gallons of oil would be stored at the facility at any one time, and 131.4 million barrels or 5.5 *billion* gallons of oil would move through the facility on an average annual basis. ASC at 2-104. For context, the proposed Tesoro oil terminal apparently would have the capacity to handle nearly 5% of the entire United States oil production,<sup>4</sup> or over 43% of the proposed capacity of the controversial Keystone XL pipeline.<sup>5</sup> Tesoro proposes to handle all this oil in a facility located on the banks of the Columbia River in a metropolitan area of over 2 million people.<sup>6</sup>

### *1. Information gaps*

Tesoro’s application lacks critical pieces of information necessary to complete a full assessment of the environmental impacts from the proposal. These information gaps must be filled as part of an adequate “detailed statement” of the proposal’s environmental impacts, RCW 43.21C.030(c), and “to ensure that SEPA’s policies are an integral part” of the Council’s decision-making process. WAC 197-11-400(1).

Tesoro’s application indicates oil will initially come by train from “Midwest oil fields,”<sup>7</sup> most likely from the Bakken formation of North Dakota. Tesoro, however, does not identify the source of the heavier crude oils proposed for transport and storage in Phase 2 of the project. Tesoro indicates that crude oil will be shipped “primarily,” but not exclusively, to West Coast refineries. ASC at 2-206. Since U.S.-sourced crude oil generally cannot be legally shipped overseas, the implication is that some of the oil shipped from the Tesoro facility would likely be of Canadian origin and destined for foreign markets. Tesoro may, in fact, be planning to use the terminal to receive, store and ship heavy crude from the Canadian tar sands. This suspicion is heightened by statements in the ASC indicating that some of the oil handled at the facility will

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<sup>4</sup> U.S. Energy Information Agency, Crude Oil Production Statistics, *available at*: <http://www.eia.gov/todayinenergy/detail.cfm?id=10171> (indicating 7.505 million barrels of total U.S. production per day in August 2013).

<sup>5</sup> U.S. Dep’t of State, Keystone XL Pipeline Evaluation Process Fact Sheet 2012, *available at*: <http://keystonepipeline-xl.state.gov/draftEIS/205549.htm>

<sup>6</sup> U.S. Census Bureau, Annual Estimates of the Population of Metropolitan and Metropolitan Statistical Areas: April 1, 2010 to July 1, 2012, *available at*: <http://www.census.gov/popest/data/metro/totals/2012/>.

<sup>7</sup> ASC at 2-206.

not be “pipeline-quality” and will need to be heated to allow for the oil to flow properly from the rail tank cars to the storage tanks and then to the tanker ships.<sup>8</sup>

The EIS must identify the source of the non-pipeline quality crude that will be delivered to the facility to ensure that the full range of the proposal’s impacts can be understood. If Tesoro intends to allow crude oil or diluted bitumen from the Canadian tar sands to be handled at the facility, the EIS must take this into account and analyze the full range of environmental impacts, including climate change impacts, associated with tar sands extraction, transport, processing, and combustion.

In addition, Tesoro has not identified which West Coast refineries or other destinations to which the crude oil will be shipped. This omission makes it impossible for the Council to assess both impacts from the proposed shipping activities impossible and potential alternatives. For the EIS to be sufficient, the applicant must provide the destinations for oil shipped from the proposed Tesoro terminal.

Publicly available copies of Tesoro’s lease agreement with the Port of Vancouver contain significant redacting that further inhibits a full assessment of the proposal’s impacts.<sup>9</sup> For example, Paragraph 8.E has a number of redactions regarding the timing for handling certain numbers of barrels per day and also gives Tesoro the option of developing a second facility if certain redacted benchmarks are met. ASC at 2-81.23. Paragraph 2.D.2 allows the Port to terminate the lease if it is not satisfied that Tesoro is prepared to begin construction by a certain time – which is also redacted. ASC at 2-81.14. In Exhibit E, key dates that Tesoro has to meet for construction commencement and completion have been redacted. ASC at 2-81.106. The definition of “Rail Facility for Unit Trains” is defined as a facility “capable of unloading more than [redacted] bpd of crude oil from trains.” ASC at 2-81.109. Additional exhibits are omitted entirely from the lease attached to the ASC, including the Tenant Environmental Questionnaire (Exhibit H), New Product Approval Process (Exhibit I), Rail Operations (Exhibit J), and Health and Safety (Exhibit L).

These redactions and omissions make it impossible to fully assess the Port’s potential economic stake in the deal and the maximum amounts of oil permitted to be moved through the site. While Tesoro states that the facility is currently designed for 360,000 barrels per day, the redactions indicate that Tesoro may have undisclosed plans to expand the facility beyond this stated limit. The EIS needs to fully consider the full scope of Tesoro plans, and the Council should require Tesoro to provide an unredacted version of its lease and all of its exhibits to prevent Tesoro from impermissibly piecemealing the environmental review for its proposal.

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<sup>8</sup> ASC at 2-87, 2-96, 2-161.

<sup>9</sup> ASC § 2.2.2, at 2-81.

## 2. *Impact of the terminal on the future of Vancouver*

The Waterfront project, which will be approximately the size of Portland's Pearl District, is the realization of a dream to reconnect the City of Vancouver with the Columbia River, and provides an opportunity to revitalize the City's economy through the development of a mixed use, sustainable, urban, waterfront community. See Exhibits B, C. It will provide lasting benefits to the community, including parklands, trail development, housing, sustainable job creation, and a permanent source of tax revenue.

In contrast, the Tesoro proposal would provide only short-term profits, temporary jobs, and an ephemeral boost in tax revenues to the City and the Port. With an initial ten year lease term followed by two five year options, the oil terminal is "designed for an anticipated lifetime of 20 years."<sup>10</sup> Yet there is no guarantee that the facility will even operate for the full 20 year period. Numerous factors could shorten the facility's operating lifespan by reducing its profitability, including volatility in international oil markets, the potential for pipeline construction to undercut oil-by-rail as an economically viable means of transporting crude oil, the potential for climate change regulations to further reduce the viability of such rail transport, and the inevitable decline in oil production from the Bakken formation. According to statements from the Port of Vancouver's Executive Director, "[t]he Port of Vancouver believes the market is solid for ten [10] years."<sup>11</sup> This type of short-lived project is not worth either the long-term impacts to the City's prospects for sustainable economic development or the risks of environmental catastrophe that the oil terminal would bring.

## II. **General Scope of the Proposal to be Evaluated in the EIS**

In adopting SEPA, the Washington legislature declared the protection of the environment to be a core state priority. RCW 43.21C.010. SEPA states that "[t]he legislature recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment." RCW 43.21C.020(3). This policy statement "indicates in the strongest possible terms the basic importance of environmental concerns to the people of the state." *Leschi v. Highway Comm'n*, 84 Wn.2d 271, 279-80 (1974).

The core of SEPA is a requirement to fully analyze projects with a significant impact on the environment. RCW 43.21C.031(1). An EIS is required for any action that has a significant effect on the quality of the environment. WAC 197-11-330. The Council has already made a determination that the proposal is likely to result in significant environmental impacts, and that an EIS is required. Washington State Energy Facility Siting Evaluation Council, Determination

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<sup>10</sup> ASC at 2-109.

<sup>11</sup> Minutes from Port of Vancouver Commission Meeting (Oct. 22, 2013).

of Significance Scoping Notice, Docket EF-131590 (Oct. 1, 2013). Areas identified for analysis in the EIS include “Geology and Soils; Vegetation, Fish, and Wildlife; Environmental Health, Noise, Risk of Fire or Explosion, Releases or Potential Release of Toxic or Hazardous Materials; Land and Shoreline Use, Population, Housing and Employment; Historic and Cultural Preservation; Aesthetics; Transportation: Vehicular, Waterborne, and Rail Traffic; Public Services and Utilities.” EFSEC, Determination of Significance Scoping Notice, Docket EF-131590. Columbia Waterfront LLC supports a thorough analysis and review of these significant potential impacts.

A. The “proposal” to be reviewed under SEPA includes the use of the Port of Vancouver’s internal rail infrastructure for oil delivery.

However, the EIS must also properly define the scope of the “proposal” to be evaluated through the environmental review process. WAC 197-11-060(3)(a). A “proposal” includes all actions that are “related to each other closely enough to be, in effect, a single course of action,” where they “(i) [c]annot or will not proceed unless the other proposals (or parts of proposals) are implemented simultaneously with them; or (ii) [a]re interdependent parts of a larger proposal and depend on the larger proposal as their justification or for their implementation.” WAC 197-11-060(3)(b).

The use of the Port’s rail infrastructure for oil by rail deliveries is an integral, interdependent part of the Tesoro proposal to be evaluated in the EIS. The Port’s rail infrastructure begins on Parcel 48843000<sup>12</sup> at the juncture of the Port’s spur line and the BNSF main line. The entire length of the Port internal rail infrastructure is used to connect the oil terminal to the BNSF railway energy distribution system, and the use of this infrastructure for oil-by-rail delivery must be treated as an integral part of the Tesoro-Savage “proposal” and analyzed in the EIS. See Exhibit A.

B. The “proposal” to be reviewed should also include integral oil-by-rail transportation actions.

The potential impacts from transportation of crude by rail and by vessels must be analyzed in the EIS, because they are both “related activities” and “indirect effects” under SEPA.

The proposed terminal will not and cannot go forward without the delivery by rail of crude to the facility. Tesoro should not be permitted to avoid environmental review for the transportation of more than 130 million barrels of crude oil annually by narrowly defining the scope of its proposal so as to exclude these transportation activities. WAC 197-11-060(3)(a) (requiring agencies to “make certain that the proposal that is the subject of environmental review is properly defined”). Since the operations of the oil terminal are dependent upon oil-by-rail

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<sup>12</sup> West Vancouver #2 Public Levee, Amos Short DLC, 4.01A.

deliveries, the terminal operations and rail transportation actions are “related to each other closely enough to be, in effect, a single course of action,” where neither action will proceed in the absence of the other. WAC 197-11-060(3)(b). Appropriate environmental review requires an analysis of the impacts of all the activities related to a proposal<sup>13</sup> The EIS must evaluate the environmental impacts from the full scope of the Tesoro “proposal,” including the impacts from railroad transportation of crude oil to the Port of Vancouver site.

Similarly, the impacts of oil trains and marine vessels must be evaluated in the EIS as indirect impacts of the oil terminal itself. Under SEPA regulations, “[a] proposal’s effects include direct and indirect impacts caused by a proposal.” WAC 197-11-060(4)(d). The regulations explicitly direct that environmental impacts outside the jurisdiction of the deciding agency must be considered. WAC 197-11-060(4)(b). Thus, while the transportation of oil trains on the BNSF main line may be outside the scope of the Council’s *regulatory* jurisdiction, the impacts of such transportation activities are fully within the scope of the *environmental review* required by SEPA.

“[I]mplicit in the statute is the requirement that the decision makers consider more than what might be the narrow, limited environmental impact of the immediate, pending action. The agency cannot close its eyes to the ultimate probable environmental consequences of its current action.” *Short v. Clallam Cnty.*, 22 Wn. App. 825, 834 (1979). For example, when considering a government action, a SEPA document must also consider the effects of private growth that may be encouraged by this governmental action. *Id.* The agency’s obligation to consider the indirect impacts of the Tesoro oil terminal compels consideration of both upstream and downstream impacts, including indirect impacts from the transportation of oil by rail to the terminal, as well as from the terminal to undisclosed destinations via marine vessels.

The EIS must consider all direct and indirect impacts of the proposal, including but not limited to the environmental impacts from (1) the estimated 3,426 annual oil train trips (including returns) necessary for the transportation of the oil from North American oil fields to the Tesoro facility, and (2) the estimated 730 marine vessel transits (including returns) used for the transportation of the oil from the facility down the Columbia River, through the Pacific Ocean, and to West Coast refineries. ASC at 4-431.

Furthermore, such an analysis would be consistent with the state’s treatment of similar transport by rail facilities. In light of the obligation to consider both direct and indirect impacts under SEPA, the Department of Ecology has required evaluation of upstream and downstream environmental impacts from the proposed Gateway Pacific Terminal. For this coal export facility, the agency is requiring, among other things:

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<sup>13</sup> Wash. Dep’t of Ecology, State Environmental Policy Act Handbook, Pub. # 98-114 (“SEPA

- A detailed assessment of rail transportation impacts in Whatcom County near the project site, specifically including Bellingham and Ferndale.
- An assessment of how the project would affect human health, including impacts from related rail and vessel transportation in Whatcom County.
- An evaluation of greenhouse gas emissions from terminal operations, and rail and vessel traffic.
- An assessment of how the project would affect human health in Washington.<sup>14</sup>

To ensure consistent application of SEPA, the Council should follow Ecology's treatment of the Gateway Pacific Terminal project with respect to the Tesoro project's potential impacts on The Waterfront, the City of Vancouver and Clark County. Thus, the Council should require (1) a detailed assessment of rail transportation impacts on Vancouver; (2) a vessel traffic study for examination of impacts in U.S. territorial waters, including a detailed risk analysis to determine the risk of an oil spill, as well as other marine traffic-related issues; (3) a detailed human health assessment covering terminal operations, as well as impacts from related rail and vessel transportation in the City and Clark County; and (4) an evaluation of greenhouse gas emissions from terminal operations, and rail and vessel traffic.

### **III. Specific Factors Related to the Built and Human Environment**

The EIS must "describe the existing environment that will be affected by the proposal, analyze significant impacts of alternatives including the proposed action, and discuss reasonable mitigation measures that would significantly mitigate these impacts." WAC 197-11-440(6)(a). The SEPA regulations provide a broad scope of the "elements of the environment" to be considered in the EIS. WAC 197-11-444. The following discusses some of the specific elements of the environment that must be evaluated in the EIS for the Tesoro proposal. While these comments focus on impacts to the City of Vancouver and The Waterfront project, the attached Exhibit F identifies additional factors that must also be evaluated in the EIS.

#### **A. Land Use**

The master plan for The Waterfront's mixed use urban community was developed through a public process and in close collaboration between the project developer, the City, and the Port of Vancouver. Recognizing the critical importance of The Waterfront to Vancouver's future, the

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Handbook"), 11-12 (2004).

<sup>14</sup> Press Release, Whatcom County, Washington State Department of Ecology, U.S. Army Corps of Engineers (Oct. 2, 2013), available at: <http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/EIS-PressRelease-73113.pdf#overlay-context=resources/press-room>.

City, the developer, BNSF, and state and federal agencies have collectively invested \$45 million in transportation improvements to facilitate the development of The Waterfront.

Increased oil train traffic immediately adjacent to The Waterfront site will cause various impacts that conflict with the development of The Waterfront in accordance with the approved master plan, including noise, vibration, aesthetics, and risk of spills. Further, the oil train traffic will conflict with the City of Vancouver's plans for development of a Waterfront Park, as user experience at the Waterfront Park will be detrimentally affected by the impacts described above. The EIS must fully assess the compatibility of the Tesoro proposal and its associated oil train traffic with the land use plans for The Waterfront and the Waterfront Park, not just the land use plans for the immediate area of the proposed terminal.

#### B. Recreation

The master plan for a new 7 acre Waterfront Park along the Columbia River shoreline was recently approved by the Vancouver City Council.<sup>15</sup> The Waterfront Park will include a half-mile long extension of the existing Waterfront Renaissance Trail, multiple gathering areas, seating, open lawn, a pedestrian pier, a floating fishing pier, and areas for both informal and formal performances. The Grant Street Plaza and Pier would extend 100 feet beyond the shoreline, and the overwater portion would provide views of Mount Hood, the Portland West Hills, and potentially the proposed Tesoro oil terminal. A variety of funding sources have made the Waterfront Park possible. In addition to its commitment to dedicating the 7 acres of shorefront property for the Waterfront Park, Columbia Waterfront LLC has committed \$3 million for park improvements. Over \$2 million federal and state grant funds have also been secured.

The EIS must include consideration of the full range of impacts that the Tesoro proposal will have on recreational activities at the future Waterfront Park and along the full length of the existing Waterfront Renaissance Trail. The Tesoro facility, including the oil trains along the BNSF main line and the Port of Vancouver spur line, will likely have noise and odor impacts on the Waterfront Park that will negatively impact recreation activities at the Waterfront Park, and must be considered in the EIS. Train noise and odors<sup>16</sup> may also limit the appeal of festivals, farmers markets, and concerts planned for the Waterfront Park, negatively impacting user experience. Due to a slight bend in the Columbia River between the Waterfront Park and the Tesoro oil terminal, the oil terminal may also be visible from the Waterfront Park and its piers, and noise from the oil tanker loading facility will travel unmuffled across the water to the

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<sup>15</sup> Minutes of Vancouver City Council Meeting (Nov. 4, 2013).

<sup>16</sup> High concentrations of hydrogen sulfide, with its "characteristic rotten egg odor with an odor threshold as low as 10 parts per billion or even less," in the crude oil proposed for delivery to the facility are a particular concern. ASC at G-28.

Waterfront Park. Noise, odor, and visual impacts analysis included within the EIS should specifically evaluate impacts from passing trains and the oil terminal activities on the Waterfront Park.

C. Transportation

The EIS must include an evaluation of the impacts of the Tesoro facility on railroad transportation. At a minimum, the proposal will result in a significant increase in train traffic through Vancouver and past The Waterfront. In 2012, the Port averaged about one unit train every two days.<sup>17</sup> At full build-out, “[c]ounting the return trips of empty trains, facility operations will result in up to 12 trains per day and 3,426 trains per year on the section of the BNSF rail lines that serve the Port.” ASC at 4-431. This means that up to 17.7 miles of new oil train cars will travel through downtown Vancouver daily, with significant impacts on local transportation systems that must be considered in the EIS.

D. Aesthetics

The Tesoro proposal will have significant aesthetic impacts on the City of Vancouver and The Waterfront. The oil terminal loading and unloading operations may be visible from the Waterfront Park, including the Waterfront Renaissance Trail and the Grant Street pier. Oil trains passing through downtown Vancouver will be visible from numerous downtown locations, including the existing Vancouver City Hall. These mile and a half long oil trains will also be visible from The Waterfront property, including numerous residential structures planned for the site and the Waterfront Park. Hydrogen sulfide odors from the oil cars are also likely to cause aesthetic harms to The Waterfront.

The EIS must include visual and odor impact analyses that clearly document the aesthetic impact of the oil terminal facilities on the Waterfront Park and the Grant Street Pier planned for the Columbia Waterfront property. Visual and odor impacts on The Waterfront community and Vancouver City Hall from passing oil trains must also be assessed in the EIS.

E. Public Services

With up to 12 unit trains per day needed to meet the demand of the Tesoro-Savage facility, significant impacts on public services in Vancouver and communities throughout the state are likely to occur. In particular, there are 18 private and 8 public at-grade crossings within the City of Vancouver. Thus, emergency services, including ambulances, fire trucks and police vehicles, will face significant delays in access to parts of Vancouver and other communities bisected by

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<sup>17</sup> A. Corvin, Port of Vancouver Jockeys for Oil Transfer Terminal, The Columbian (June 23, 2013), available at: <http://www.columbian.com/news/2013/jun/23/oil-transfer-terminal-port-of-vancouver-jock/>.



rail lines used for the oil trains. Emergency services to some residential areas along the Columbia River could be completely cut off for long periods of time by lengthy, slow-moving or stopped oil unit trains.

The SEIS must include a complete evaluation of the effects of the oil trains on emergency response time. Specifically, the SEIS must include estimates of total response time delays for ambulances, fire trucks, and police vehicles during the 10 to 20 year estimated life of the Tesoro-Savage Facility. Inevitably, delayed emergency response time will lead to medical complications, loss of life, and property damage. Quantitative analysis should be employed to estimate the economic cost of delays in emergency service response time, as well as the number of lives likely to be lost as a result of such emergency response delays.

#### F. Noise and Vibration

The oil trains travelling to the Tesoro-Savage facility will pass through numerous Washington communities, including the City of Vancouver. Noise analysis should be conducted as part of the SEPA environmental review to quantify the noise impacts of these trains on the affected communities. At The Waterfront, 10 of the 22 city blocks and numerous residential structures will be within 100 feet of both the BNSF main line and the Port of Vancouver spur line on which the oil trains are proposed to pass. See Exhibit B. An assessment of train noise including engine noise, vibrations, horn noise, and brake noise should be included as part of the EIS. This should include quantitative modeling of the noise generated by the trains at a location 100 feet south of the juncture between the BNSF main line and the Port of Vancouver spur line.

The noise assessment should not only document the maximum noise anticipated to be generated by the oil trains, but should assess the timing, duration and frequency of the noise. Particular attention should be paid to the frequency of trains that will be traveling through the City of Vancouver during night hours.

#### G. Health and Safety

##### *1. Risk of explosion*

The Tesoro proposal presents numerous health and safety risks to the people of Washington. Among the most concerning is the significant risk of an explosion occurring along the oil train route or at the facility itself. Again, 10 of the 22 city blocks comprising The Waterfront will be within 100 feet of both the BNSF main line and the Port of Vancouver spur line. See Exhibit B. The risks to The Waterfront and downtown Vancouver must be fully assessed in the EIS.

As the number of oil trains travelling on North American railroads has increased over the past few years, the number of catastrophic accidents has also increased. Several recent examples of

train accidents show that the safety of oil-by-rail is not assured and must be assessed in the EIS.<sup>18</sup> On July 6, 2013, the risk of oil-by-rail caught the world's attention when a train carrying crude oil derailed, causing multiple explosions and a large fire that killed 47 people and left the town of Lac-Megantic, Quebec in ruins. While the investigation into that disaster is ongoing, initial reports from the Canadian Transportation Safety Board indicate that at least some of the Bakken crude being transported was significantly more volatile than labeled, and that "[t]he lower flash point of the crude oil explains in part why it ignited so quickly once the Class 111 tank cars were breached."<sup>19</sup> In response, U.S. regulators launched Operation Classification, known as "The Bakken Blitz," "an inspection operation to verify that crude oil is being properly classified in accordance with federal regulations."<sup>20</sup>

Prior to this explosion, the American Association of Railroads (AAR) had petitioned the Pipeline Hazardous Materials Safety Administration (PHMSA) to adopt more stringent requirements for Class 111 (DOT-111) rail cars used to transport more volatile crude oils.<sup>21</sup> When the railroad industry itself specifically requests stricter regulations regarding the design of tank cars used to transport volatile crude oil, it is clear that the current regulations are inadequate to ensure the safe transport of crude oil along American railways and through cities and towns, such as Vancouver. Industry subsequently voluntarily adopted stricter standards than required by federal rules for new tank cars carrying more volatile classes of crude oil, the CPC-1232 standard.<sup>22</sup> AAR has estimated that while there are approximately 19,000 DOT-111 cars in service that meet the CPC-1232 standard, approximately 78,000 DOT-111 cars in service do not meet that standard.<sup>23</sup>

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<sup>18</sup> In one recent example, eleven tank cars carrying crude oil burst into flames after derailling in rural Alabama on November 8, 2013. E. McCallister, Train Carrying Crude Oil Derails, Cars Ablaze in Alabama, REUTERS (Nov. 8, 2013), available at: <http://www.reuters.com/article/2013/11/08/us-crude-train-explosion-idUSBRE9A70Q920131108>.

<sup>19</sup> Transportation Safety Board of Canada, Rail Safety Advisory Letter 13-13 (Sept. 11, 2013), available at: <http://www.tsb.gc.ca/eng/medias-media/sur-safe/letter/rail/2013/r13d0054/r13d0054-617-13-13.asp>.

<sup>20</sup> C. Quarterman, PHMSA Administrator, U.S. Dep't of Trans., Rail Safety is a National Priority (Sept. 4, 2013), available at: <http://www.dot.gov/fastlane/rail-hazmat-safety-national-priority>.

<sup>21</sup> Petition P-1577 (discussed in Comments of the American Association of Railroads and the American Short Line and Regional Railroad Association, Docket No. PHMSA—2012—0082: Hazardous Materials: Rail Petitions And Recommendations to Improve the Safety of Railroad Tank Car Transportation (RRR) ("AAR Comments"), available at: <http://www.scribd.com/doc/186006741/PHMSA-ANPRM>.

<sup>22</sup> AAR Comments at 3.

<sup>23</sup> *Id.* at 10–11.

In light of the Lac-Megantic disaster, the AAR has requested that federal standards be tightened beyond the existing voluntary CPC-1232 standards.<sup>24</sup> In written testimony provided to the PHMSA, AAR stated that the proposed revisions to the tank car standards “would significantly decrease the probability of a release in an accident.”<sup>25</sup> Specifically, the improvements would reduce the probability of releases by increasing puncture resistance, reduce releases from top fittings and bottom outlets, and require thermal protection to reduce the probability of a tank car rupture resulting from fire. The industry has further expressed support for “retrofitting existing cars and an aggressive phase-out schedule for cars that cannot meet retrofit requirements.”<sup>26</sup>

In September 2013, the PHMSA issued an Advance Notice of Proposed Rulemaking, a first step towards tightening the DOT-111 regulations for tank cars carrying hazardous liquids, such as crude oil.<sup>27</sup> However, the outcome of such regulatory efforts, including the critical issue of whether existing cars will be rapidly retrofitted or phased out of service, remains uncertain.

While Tesoro has not identified the exact source of the oil proposed for delivery to the Port of Vancouver facility, much of the oil will likely be sourced from the Bakken formation, the source of the oil which exploded in devastating fashion in Lac-Megantic.<sup>28</sup> Given industry and regulatory recognition that current safety standards are insufficient, the EIS must take a hard look at the risk of an explosion from a 120-car oil train carrying highly volatile (Packaging Group I) crude oil in pre-2011 Class 111 cars in the event of a train derailment or collision. This analysis should take into account the densely populated areas traversed by the proposed oil trains, including The Waterfront. See Exhibit B. Potential impacts from such a derailment and explosion that must be assessed include air quality impacts, water quality impacts, human health impacts, and transportation impacts.

There is also a risk of explosion during transfer and storage activities on the Port site. The EIS must assess the impact of an uncontrolled fire in one or more of the large ASTs. In particular, human health impacts on Port of Vancouver workers, residents of the Fruit Valley neighborhood, and residents in The Waterfront and downtown Vancouver areas must be assessed under different environmental conditions, including various wind directions and speeds.

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<sup>24</sup> After the Lac-Megantic explosion, Canadian regulators have also called into question “the adequacy of Class 111 tanks cars for use in transporting large quantities of low flash flammable liquids.” Transportation Safety Board of Canada, Rail Safety Advisory Letter 13-13 (Sept. 11, 2013).

<sup>25</sup> *Id.* at 8.

<sup>26</sup> *Id.* at 11.

<sup>27</sup> U.S. Dep’t of Transp., Pipeline Hazardous Materials Safety Administration, Hazardous Materials: Rail Petitions and Recommendations To Improve the Safety of Railroad Tank Car Transportation (RRR), 78 Fed. Reg. 54849 (Sept. 6, 2013).

<sup>28</sup> Transportation Safety Board of Canada, Rail Safety Advisory Letter 13-13 (Sept. 11, 2013).

In addition to the inherent risks of explosion associated with handling large volumes of flammable, volatile liquid crude oil, the Port of Vancouver site is located in a seismically active region “capable of producing earthquakes of magnitude (M) 9 or greater.” ASC at 2-192, 3-228. Further, the proposed site is “located in a high liquefaction-susceptible soil area.” ASC at 3-233. The EIS must fully assess the risks of a large-magnitude earthquake on the Tesoro project site, and the potential for fire, explosion, or oil spill as a result of an earthquake. Particular attention must be paid to the risk of soil liquefaction, and the potential for resulting structural damage to both on-site oil trains and oil storage tanks.

## 2. *Toxic air emissions*

The Tesoro proposal involves the daily handling of 360,000 barrels of oil, requiring the transfer of oil from approximately 400 to 480 train cars to the onsite oil storage tanks. Tesoro accepts that handling such large quantities of oil will inevitably lead to emissions of toxic air pollutants. In the aggregate, two and a half *tons* of Hazardous Air Pollutants will be discharged annually by the facility’s normal operations, including Acetaldehyde, Benzene, Carbon Monoxide, Cyclohexane, Naphthalene, and many others. ASC at 5-476 to 5-477 & Fig. 5.1-14.

Mitigation measures should be considered in the EIS to reduce the potential for such emissions, including confining oil transfer activities to indoor facilities with emissions capture and control technologies. While mitigation measures could potentially reduce the emissions from the proposed facility, the Council must recognize that toxic air emissions cannot be completely mitigated, and that some emissions will be inevitable.

The EIS must also take a hard look at the potential impacts of increased emissions of air pollutants from the Tesoro facility on Port workers, as well as Vancouver residents. Particular attention must be paid to impacts on the nearby Fruit Valley neighborhood, as well as on the thousands of workers and residents planned for The Waterfront community.

The oil trains used to deliver oil to the Port of Vancouver will also generate emissions due to the combustion of diesel fuel. A full assessment of the emissions from these trains must be included within the scope of the EIS. This assessment should include a detailed assessment of the potential impact of emissions from the trains on the health and welfare of the residents of the City of Vancouver and The Waterfront community.

## H. Human environment

The EIS must include a detailed examination of the impacts of the Tesoro proposal on the local economy. While Tesoro’s proposal suggests that up to 110 jobs may be created for a period of 10

to 20 years,<sup>29</sup> the negative economic impacts of the project will persist in perpetuity. Specifically, the EIS must assess the potential negative impacts of the Tesoro oil terminal and associated oil train activities on The Waterfront project and downtown Vancouver.

The economic impact of The Waterfront project on the local economy dwarfs that of the Tesoro proposal. Construction activities at The Waterfront will generate over 4,580 direct jobs, paying an estimated \$244 million in labor income, and contributing \$318 million in value-added output. With an additional 2,600 indirect jobs generated by the construction activities, the total economic impact on Clark County from construction activities would be over \$927 million. Even more importantly, ongoing business activity at the completed Waterfront is estimated to generate 1,364 direct jobs, contributing \$64.8 million in annual labor income, and \$59.6 million in value-added output to the Clark County economy. Including indirect and induced impacts, a total of 2,043 permanent jobs will result from The Waterfront, with total annual output estimated to be in excess of \$185.5 million per year. Exhibit D.

In contrast to the 20-year maximum lifespan of the “permanent” jobs generated by the Tesoro project, the economic development at The Waterfront will be permanent. The Waterfront Park and the site’s immediate connection to downtown Vancouver will help ensure the long-term desirability and economic vitality of The Waterfront. The EIS must consider the significant economic development and employment benefits from The Waterfront, as a direct comparison to the minimal economic benefits generated within Clark County by the Tesoro proposal.

The EIS must also consider the potential negative impacts that the Tesoro proposal will have on The Waterfront development, particularly the 17.7 miles of oil tanker cars expected to travel past The Waterfront each day, within 100 feet of 11 of the development’s 22 city blocks. See Exhibit B. The noise, vibration, emissions, risk of explosions, and aesthetic impacts from the oil trains will negatively impact the development potential of The Waterfront. Any impact the oil trains have on actual or projected property values at The Waterfront site will consequently negatively impact the ability of the project developers to secure additional investors needed to fully develop to its maximum potential as a world-class waterfront community. Faced with the prospect of up to 17.7 miles of oil trains per day passing along the edge of the property,<sup>30</sup> investors may reduce initial investments, leading to a lower quality of developed physical environment. Reduced initial investments in the physical development will permanently impair the ultimate economic value generated by The Waterfront project. This impact will extend well beyond the boundaries of The Waterfront, and have significant impacts on the ongoing redevelopment efforts in downtown Vancouver.

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<sup>29</sup> ASC at 6-373

<sup>30</sup> (12 trains per day) \* (7,800 feet per train) / (5,280 feet per mile) = 17.7 miles per day

The EIS must include an assessment of the economic impacts of the Tesoro proposal, including on The Waterfront development and downtown Vancouver. This analysis should utilize the IMPLAN model or equivalent Multiplier Model able to accurately project impacts across various industries and economic sectors. See Exhibit D.

A report by Johnson Economics assessed the likely impacts of the Tesoro-Savage Facility on The Waterfront development, finding that the operation of the oil terminal “would be expected to negatively impact achievable pricing, the pace of absorption and acceptable developer returns,” and that “[a]s a direct result, the resulting pattern and pace of development at The Waterfront . . . would be expected to be substantially impacted. Based on previous analyses of a similar range of expected impacts, a reduction in the overall development program of approximately 30% would be a reasonable expectation of impact.” Exhibit D.

Modeling the effects of the Tesoro operations on The Waterfront development, Johnson Economics found that the Tesoro project would result in over 2,100 less jobs associated with The Waterfront construction, and 613 less permanent jobs. The net negative impact on overall output would be expected to be close to \$280 million for construction, with an additional negative impact of \$55.7 million per year associated with ongoing operations.

Additional negative impacts on downtown Vancouver may also be expected. Based on its “expert opinion that the proposed facility will substantively impact development activity in downtown Vancouver, reducing achievable pricing as well as increasing perceived development risk,” Johnson Economics utilized a predictive development/redevelopment model to quantify these predicted impacts on downtown Vancouver. Exhibit E. The model results show that the Tesoro facility will result in a \$98.3 million reduction in new construction investment, a 341,000 square foot reduction in commercial space, and a net change of \$138.1 million reduction in Real Market Value. Exhibit E. Thus, the negative economic impacts of the Tesoro proposal greatly exceed any projected economic gains from the project. See Exhibits D, E. The EIS should use the same or equivalent methodology when examining the impacts of the Tesoro project on downtown Vancouver.

The Tesoro ASC touts the proposal’s predicted tax benefits, but fails to discuss the negative impacts that the proposal will also have. The Applicant projects less than \$10 million in initial tax revenue, with the vast majority going to the State of Washington, not local governments in the areas most impacted by the proposal. ASC at 4-462 to 463. Ongoing tax revenues of less than \$1.6 million are expected to be generated by the proposal. *Id.* The EIS must also consider the negative impacts of the proposal on tax revenues. As discussed above, the noise, vibrations, emissions, risk of explosion and aesthetic impacts of the approximately 12 miles of oil trains running through downtown Vancouver and adjacent to The Waterfront project will negatively impact property values on both sides of the railroad tracks. These property tax impacts will

negatively impact tax revenues generated. In the absence of the Tesoro proposal, The Waterfront development is expected to generate more than \$31 million in initial tax revenues associated with construction activities, and ongoing tax revenues of \$6.5 million annually. If the Tesoro project is constructed, these construction-related revenues are projected to be reduced by over \$9 million, while ongoing revenues would be reduced by nearly \$2 million annually, quickly negating any tax gains from the Tesoro proposal. Exhibit D.

The Council should carefully scrutinize the job estimates provided by Tesoro. In particular, the Council should assess the likelihood of the facility operating for the projected full twenty year life span, or whether the oil terminal is likely to cease operating sooner. For example, given the economic efficiency of transporting oil by pipeline, as opposed to train, a pipeline to the West Coast could potentially out-compete the Tesoro rail-by-oil project based on price, and the Tesoro project could be shuttered as unprofitable. In addition, heightened regulations regarding the design and structural integrity of oil train cars could raise the cost of transporting oil by rail and further reduce the Tesoro proposal's competitiveness on the market. Further, the Bakken formation contains the first oil shale deposit heavily developed through hydraulic fracturing technologies, and the long-term productivity of the formation is unknown. Declining yields and increased drilling costs could lead to a rapid decline in economically-viable production from the Bakken formation,<sup>31</sup> reducing the supply of domestically-produced oil available for transport to the Tesoro oil terminal. The EIS must consider this significant risk that the full economic benefits estimated by the project applicant will never be realized.

In addition to negatively impacting other developments planned for Vancouver, the construction of the 360,000 barrel per day oil terminal at the Port of Vancouver will preclude the Port from using this site for any other economically productive uses. There are likely no viable alternative uses for the Tesoro facilities to be constructed on the site, limiting the ability of the Port to redevelop the property for alternative uses in the future after the Tesoro facility is shuttered. The site was previously used for the outdoor storage of wind turbines, and could continue to be used for other similar activities. The EIS should fully assess the opportunity costs to both the Port and City of Vancouver of tying up the Port property for the Tesoro proposal.

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<sup>31</sup> In discussing data regarding the impact of declines in productivity from existing wells on overall Bakken production, the Director of Energy Markets for the U.S. Energy Information Institute, Lynn Westfall, stated that "One of the things that surprised us as we got into it was how many new wells you have to have just to stay even with the decline. If you looked at our data from Bakken for instance and do the math, it shows that for every 100 barrels you produce from new Bakken wells, 70 barrels of that go just to replace the decline from old wells." L. Geiver, EIA Director Explains New Drilling Production Model, Bakken Shale, THE BAKKEN MAGAZINE (Oct. 23, 2013), available at: <http://www.thebakken.com/articles/386/eia-director-explains-new-drilling-production-model-bakken-shale>.

#### **IV. Cumulative Impacts**

The EIS must include an assessment of the cumulative impacts of the proposed BHP Billiton potash export facility also planned for the Port of Vancouver's Terminal Five area. The Port has entered into several agreements with BHP Billiton regarding the development of the potash export facility, including an Agreement for Lease, Entry Agreement, and Site Improvement Agreement.<sup>32</sup> BHP Billiton plans to use Washington rail lines to deliver up to an estimated 32 million tons of potash each year to the Port of Vancouver.<sup>33</sup> The rail infrastructure improvements used for the Tesoro facility would also be used to facilitate the proposed potash export activities. The plans for potash export are sufficiently well-developed that the cumulative impacts of the potash export facility are not speculative. At least with respect to the cumulative impacts of additional rail traffic, these impacts can be reasonably projected and should be included within the EIS.

The world's largest potash exporter, Canpotex, indicates that its unit trains are up to 170 cars long and can transport an estimated 17,500 tons of potash each.<sup>34</sup> Assuming BHP Billiton would utilize a similar scale of unit train to deliver potash to the Port of Vancouver, this would mean approximately 1,828 additional unit trains and over 310,000 train cars each year would move along Washington's rail system, through the Columbia Gorge and the City of Vancouver.

The EIS must consider the cumulative impacts from the additional train traffic planned for the BHP Billiton facility located at Terminal 5, including air emissions, transportation impacts, including delays on emergency services, noise, vibration, aesthetics, and associated negative impacts on property values. These cumulative impacts should be assessed along the full length of the affected rail lines within the state of Washington, including the City of Vancouver as well as affected communities in the Columbia Gorge and eastern Washington.

#### **V. Alternatives to be Evaluated in the EIS**

SEPA requires the consideration of reasonable alternatives that meet the proposal's objectives at a lower environmental cost. WAC 197-11-440(5)(b). Tesoro states that "[t]he Facility's principal

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<sup>32</sup> See Minutes of Feb. 12, 2013 Port of Vancouver Commission Meeting. Under these agreements, BHP Billiton is contributing funds for the construction of the Terminal 5 rail improvements that will also be used for the Tesoro-Savage oil terminal. *Id.* See also Port of Vancouver USA, Terminal Five Loop Expansion Reaches Substantial Completion! (April 23, 2013), available at: <http://www.portvanusa.com/industrial/terminal-5-loop-track-expansion-reaches-substantial-completion/>; A. Corvin, BHP Signals Commitment to Port of Vancouver Project, THE COLUMBIAN (Aug. 22, 2013), available at: <http://www.columbian.com/news/2013/aug/22/bhp-port-vancouver-project-potash-export-facility/>.

<sup>33</sup> Minutes of Feb. 12, 2013 Port of Vancouver Commission Meeting.

<sup>34</sup> <http://www.canpotex.com/what-we-do/logistics>



purpose is to provide North American crude oil to U.S. refineries to offset or replace declining Alaska North Slope crude reserves, California crude production, and more expensive foreign crude-oil imports.” Cover Letter to ASC at 1. The alternatives described below are reasonable and should be considered in the EIS.<sup>35</sup>

A. The “No-Action” Alternative

An EIS is required to be considered a “no-action” alternative.” WAC 197-11-440(5)(b)(ii). The “no-action” alternative should assess the future of downtown Vancouver *with* The Waterfront redevelopment and *without* the Tesoro project. As detailed above in Section III(G), the total economic development benefits of The Waterfront may be significantly reduced by the construction and operation of the Tesoro-Savage Facility. The EIS should thoroughly examine the potential impacts to Vancouver if real or perceived impacts from the Tesoro proposal result in delays in construction, or reduced development of The Waterfront. Such delayed, reduced level or lower quality development would have long-term impacts on the economy of Vancouver and the region.

B. The Pipeline Alternative

The use of trains to carry crude oil in large quantities is a very recent phenomenon in the United States. According to the American Association of Railroads (AAR), U.S. Class I railroads originated just 9,500 carloads of crude oil in 2008.<sup>36</sup> By 2012, nearly 234,000 carloads were originated, and the number has continued to increase.<sup>37</sup> Nonetheless, the Tesoro proposal represents an enormous further increase in the use of railroads for oil transportation. The AAR estimates that 762,000 barrels per day of crude oil were transported on all Class I railroads in the country in the first quarter of 2013.<sup>38</sup> With an estimated delivery capacity of 360,000 barrels per day, the Tesoro-Savage oil terminal would require nearly a 50% increase in the total number of oil trains moving in the entire country.

While the use of oil trains has dramatically increased in recent years, oil pipelines remain the dominant means of transporting crude oil. According to the American Petroleum Institute, “pipelines are widely acknowledged to be the safest and most efficient way to move energy products overland for long distances; crude oil and natural gas from production areas to

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<sup>35</sup> An alternative may be taken into account in an EIS for comparative purposes, even if the alternative’s legal status is contested or uncertain. An alternative need only be reasonable. See *King County v. Central Puget Sound Growth Management Hearings Bd.*, 138 Wn.2d 161 (1999).

<sup>36</sup> American Association of Railroads, *Moving Crude Oil by Rail* (May 2013), available at: <https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf>

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*

processing plants and refineries, and consumer-ready products to markets.”<sup>39</sup>

A new pipeline from the Midwest to the Port of Vancouver or directly to U.S. refineries would potentially allow Tesoro to meet the primary project objective at a lower environmental cost. The EIS must consider the construction and operation of an oil pipeline to the Port of Vancouver or the destination West Coast refineries as an alternative to the crude-by-rail proposal.

While proposals for private actions on specific sites are not required to analyze off-site alternatives, WAC 197-11-440(5)(d), environmental review for public projects must include a consideration of off-site alternatives. See *Weyerhaeuser v. Pierce Cnty.*, 124 Wn. 2d 26, 42 (1994). This is not a “private project” because it was not “primarily initiated or sponsored by an individual or entity other than an agency.” WAC 197-11-780. Instead, off-site alternatives must be considered because the Port of Vancouver has been so closely involved in the initiation and development of the proposal that the oil terminal is, in effect, a joint venture between the Port of Vancouver and Tesoro:

The Port issued a “statement of interest” seeking proposals to develop a petroleum by rail facility at the Port. Tesoro, a long term Port tenant, teamed with Savage Services Corporation to jointly submit a proposal to the Port for the formation of the Application and development of the Facility. The Port received four proposals and after consideration of a variety of criteria, including safety, environmental, community, financial, market and operations, selected the Applicant to enter into negotiations for the site.

ASC at 2-206. See *Weyerhaeuser v. Pierce Cnty.*, 124 Wn. 2d 26, 42 (1994) (holding landfill proposal to be a “public project” based on a contract between Pierce County and the private landfill developer, County involvement in the “initiation of the landfill project, regardless that it has done so through contracting out aspects of waste collection and disposal,” and the characterization of waste disposal as a “governmental function”). Since the Tesoro proposal is a public project, the EIS must include a consideration of off-site pipeline alternatives.

### C. Exclusive Rail Transport Alternative

Tesoro has indicated that the purpose of the proposal is to deliver crude oil primarily to West Coast refineries. The EIS must also consider delivering oil directly to these facilities exclusively by rail. Such an alternative would completely negate the stated need for the Tesoro proposal, potentially meeting the stated project’s needs at a lower environmental cost. Oil by rail handling

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<sup>39</sup> American Petroleum Institute, Facts About Pipeline Safety and Canadian Crude (April 1, 2013), available at: [http://www.api.org/~media/Files/Oil-and-Natural-Gas/Oil\\_Sands/Pipeline-Fact-Sheet-Canadian-Crude-4-1-2013.pdf](http://www.api.org/~media/Files/Oil-and-Natural-Gas/Oil_Sands/Pipeline-Fact-Sheet-Canadian-Crude-4-1-2013.pdf).

facilities are in existence or in the permitting process at multiple West Coast refineries,<sup>40</sup> and Tesoro already delivers oil by rail directly to its Anacortes refinery.<sup>41</sup> Thus, it is logistically feasible to deliver oil by rail directly to West Coast refineries.<sup>42</sup> A full discussion of this alternative is currently precluded by Tesoro's lack of transparency regarding which West Coast refineries to which it intends to deliver oil; however, the EIS should consider the direct delivery of oil by rail to West Coast refineries as an alternative to the current proposal.

#### D. Existing Rail Spur Alternative

Tesoro proposes to use the new Port of Vancouver rail spur developed as part of the West Vancouver Freight Access Project for oil train access to the terminal. This route follows the northern edge of The Waterfront property to its western terminus. A reasonable alternative for the proposal would be to require the oil trains to utilize the existing Port of Vancouver rail access located at Industrial Way, several blocks north of the proposed access. See Exhibit A. This alternative would reduce the impacts of the oil trains on the western half of The Waterfront property, and promote higher quality residential development in this area. Given the critical importance of The Waterfront project to the economic future of the City of Vancouver, even a marginal reduction in the oil train impacts could have substantial benefits for the wider region. As an alternative to the Tesoro- proposal, the EIS must consider utilizing the existing Industrial Way rail access to the Port of Vancouver for the oil trains instead of the new rail spur.

### VI. Mitigation and Substantive Authority

SEPA provides state agencies with substantive authority to condition or deny proposals under SEPA to mitigate environmental impacts of proposed actions. WAC 197-11-660. By rule, EFSEC has formally adopted the authority to recommend rejection of an application "if reasonable mitigation measures are insufficient to mitigate significant adverse environmental impacts" and the proposal is inconsistent with "the overriding policy of the council . . . to avoid or mitigate adverse environmental impacts which may result from the council's decisions." WAC 463-47-110.

The EIS must consider all reasonable means of mitigating the significant environmental effects of the Tesoro proposal; however, there may be no reasonable mitigation measures available to effectively address all impacts. If the proposal's impacts cannot be adequately mitigated, then the Council should recommend that the Governor deny Tesoro's application. WAC 197-11-660.

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<sup>40</sup> See E. De Place, The Northwest's Pipeline on Rails, The Sightline Institute (Oct. 2013), available at: [http://www.sightline.org/wp-content/uploads/downloads/2013/07/crude-oil-by-rail\\_August-Update.pdf](http://www.sightline.org/wp-content/uploads/downloads/2013/07/crude-oil-by-rail_August-Update.pdf).

<sup>41</sup> K. Hays, Tesoro Says Rail-to-Barge Oil Port for Entire West Coast, REUTERS (Aug. 2, 2013), available at: <http://www.reuters.com/article/2013/08/02/tesoro-rail-crude-idUSL1N0G313N20130802>

<sup>42</sup> A. Sider, Moving Crude by Railcar Stalls on Tracks, WALL STREET JOURNAL (Dec. 5, 2013), available at: <http://online.wsj.com/news/articles/SB1000142405270230332904579224000594400852>.

This substantive authority underscores that a thorough analysis of all potential significant impacts from the Tesoro-Savage Facility is a crucial step in the Council's review of the application. Without a comprehensive environmental review, neither the Council or the public will be able to ascertain whether the significant adverse environmental impacts of this proposal are capable of mitigation.

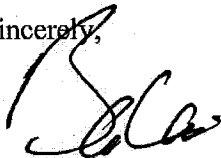
#### **VII. Compliance with NEPA**

The ASC indicates that the applicant has prepared and will submit a federal Joint Aquatic Resource Permit Application to the U.S. Army Corps of Engineers. The applicant must therefore also comply with the requirements of the federal National Environmental Policy Act. 42 U.S.C. 4321 et. seq. The Council should clarify for the public how the NEPA and SEPA processes will be managed, as well as how public participation in the NEPA process will be handled.

#### **VIII. Conclusion**

Thank you for the opportunity to comment on the scope of the SEPA review required for the proposed Tesoro oil terminal. The myriad environmental risks posed by this proposal are difficult to overstate and must be considered thoroughly in the EIS. It is not hyperbole to state that the future of Vancouver is at stake. A thorough environmental review is needed to ensure that the long-term benefits of an urban, sustainable waterfront community connecting downtown Vancouver to the Columbia River are not sacrificed for short-term profits, temporary jobs, and a short-term and potentially illusory boost in tax revenues.

Sincerely,



Barry Cain  
Columbia Waterfront LLC

#### Exhibits enclosed:

Exhibit A: Vicinity Map

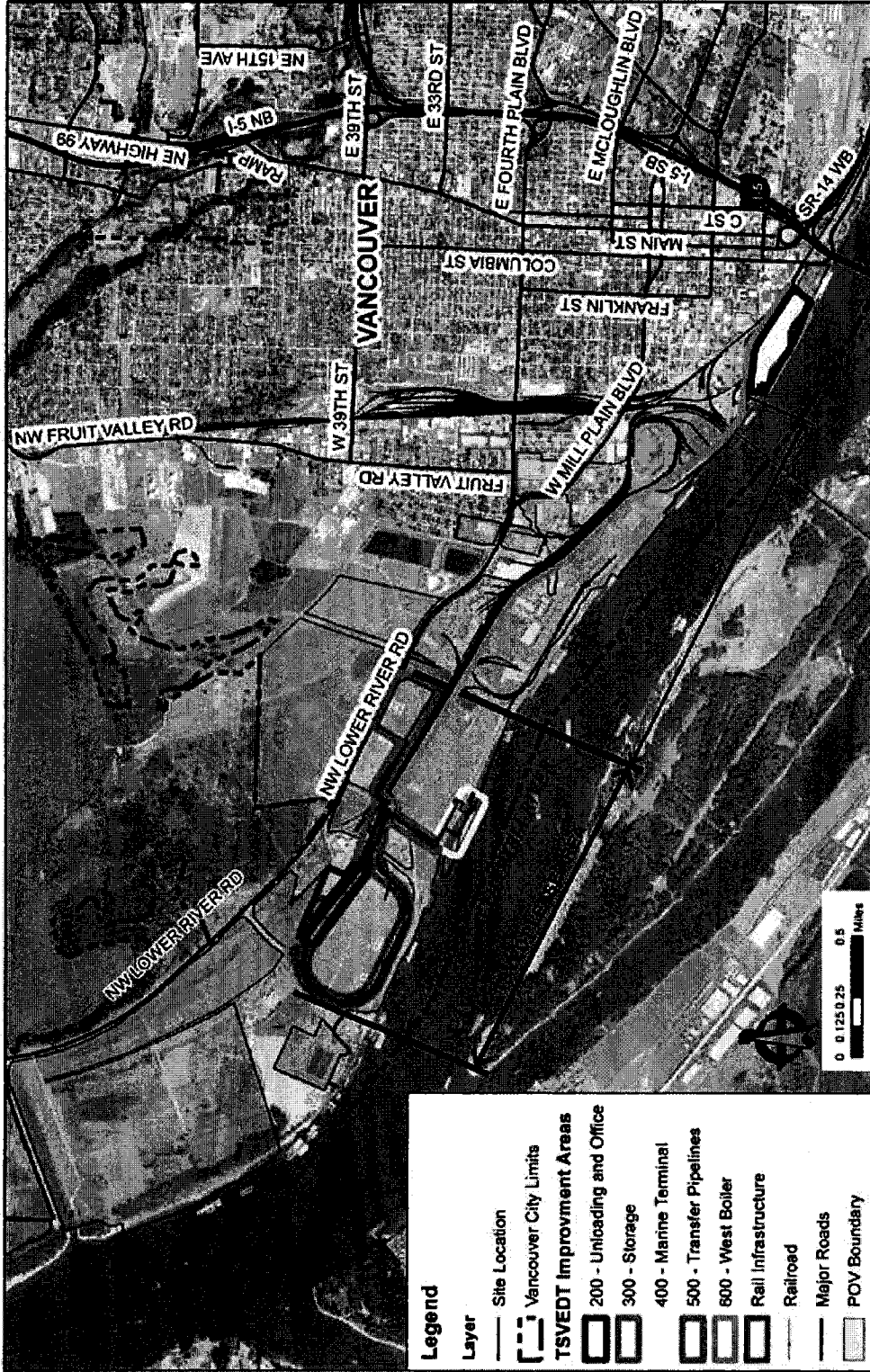
Exhibit B: Site Location

Exhibit C: Visual Representation of The Waterfront

Exhibit D: Johnson Economics, Estimated Economic and Fiscal Impacts of the Tesoro Savage Facility on the Waterfront Vancouver Development and Downtown Vancouver

Exhibit E: Johnson Economics, Predicted Impacts of the Tesoro Savage Facility on Development and Redevelopment in Downtown Vancouver, Washington

Exhibit F: Additional Environmental Factors

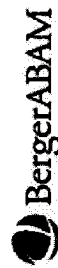


 Port of Vancouver  
 Railroad  
 Vancouver  
 Waterfront  
 Development

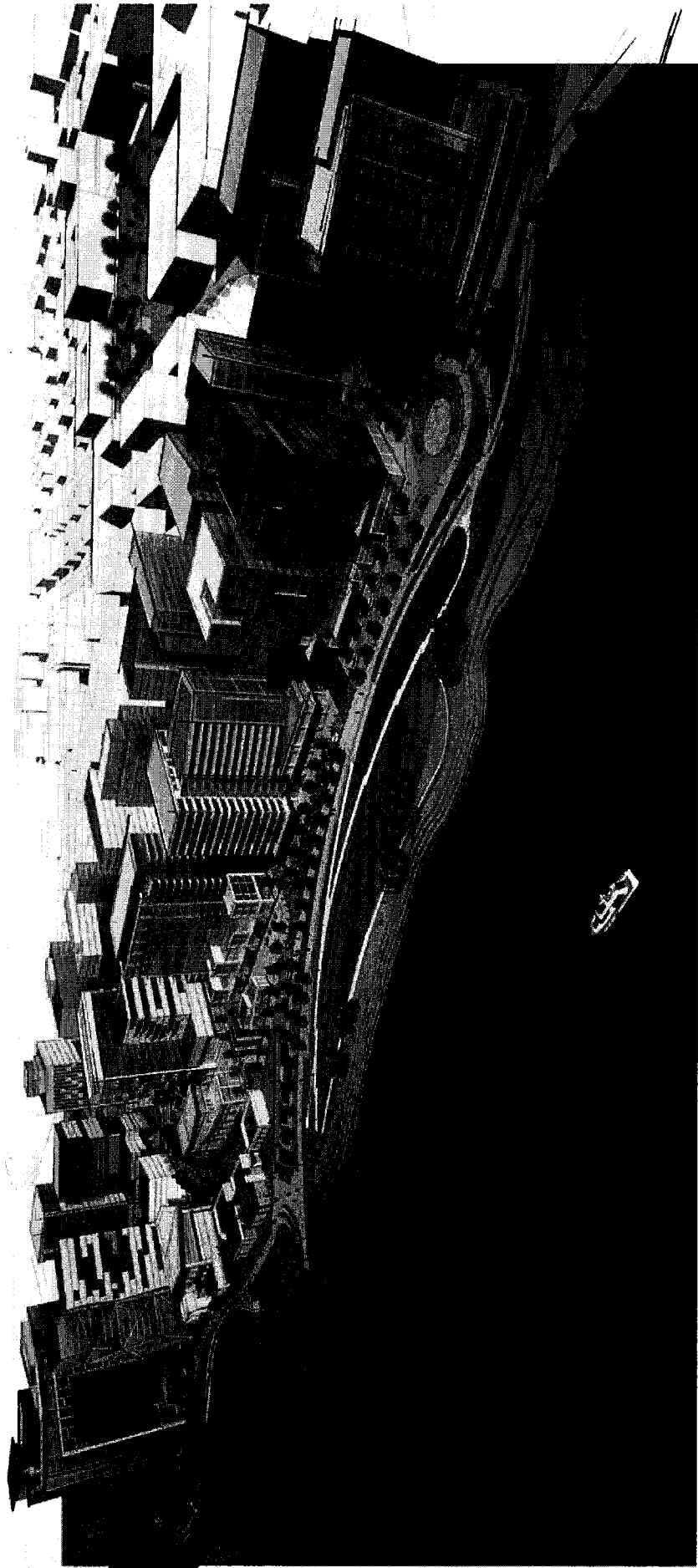
# EXHIBIT A

Image from Tesoro Savage  
 Energy Distribution Terminal  
 Application No. 2013-01

Figure 2.1-1. General Vicinity Map







## EXHIBIT C

Visual Representation of The Waterfront



Exhibit D

**ESTIMATED ECONOMIC AND FISCAL IMPACTS  
OF THE TESORO SAVAGE FACILITY ON THE  
WATERFRONT VANCOUVER DEVELOPMENT AND  
DOWNTOWN VANCOUVER**

DECEMBER 9, 2013



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# I. EXECUTIVE SUMMARY

- The proposed Tesoro Savage Vancouver Energy Distribution Terminal be expected to have a substantial impact on the magnitude, character and pace of development in downtown Vancouver. The primary impact would be related to rail access to the facility that would be routed along the northern edge of The Waterfront Vancouver, a major mixed use redevelopment site immediately southeast of the Port properties. When fully operational, the facility will generate a significant level of train traffic along the rail line spur immediately north of The Waterfront, which will generate noise, visual impacts as well as an increased level of risk associated with the explosive nature of the cargo being transported.
- The current development program for the Waterfront Vancouver development is projected to yield just under 3,000 residential units, 800,000 square feet of office space, 166,400 square feet of retail space, a 318 room hotel and associated parking for the development. The estimated construction costs for the anticipated program are over \$800 million in current dollars. In addition, the master plan includes a number of public spaces, including plazas and parks, which would entail significant construction costs.
- The expected economic impact of the development on Clark County would be realized initially through construction, but on an ongoing basis beyond that from the operation of businesses and expenditures of residents in the development. To evaluate the construction impacts of each scenario, we modeled the estimated impacts of the current master plan, and reconciled those impacts with a second scenario that assumed a 30% reduction in development yield on the site. The economic impacts of on-going activity was also evaluated. These impacts reflect the permanent annual impacts resulting from the completed construction of the development and resulting "business activities".
- The resulting net indicated impact would be over 2,100 FTE jobs associated with construction, with an additional 613 jobs on an ongoing annual basis. The net impact on overall output would be expected to be close to \$280 million for construction, with an additional impact of \$55.7 million per year associate with ongoing operations (expressed in current dollars).

**Impact Summary** Waterfront Vancouver Net Construction Impact

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	(1,374)	(\$73,470,501)	(\$95,469,450)	(\$182,559,901)
Indirect Effect	(373)	(\$15,537,859)	(\$24,672,986)	(\$44,191,043)
Induced Effect	(407)	(\$16,923,287)	(\$31,434,987)	(\$51,493,613)
Total Effect	(2,154)	(\$105,931,647)	(\$151,577,423)	(\$278,244,556)

**Impact Summary** Waterfront Vancouver Net Annual Operations Impact

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	(409)	(\$19,428,528)	(\$17,884,670)	(\$32,685,806)
Indirect Effect	(100)	(\$3,436,292)	(\$5,709,186)	(\$9,783,565)
Induced Effect	(104)	(\$4,337,622)	(\$8,045,412)	(\$13,186,021)
Total Effect	(613)	(\$27,202,442)	(\$31,639,268)	(\$55,655,392)

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- In addition to economic impacts, the impact would be expected to also have fiscal implications for the City of Vancouver, Clark County and the State of Washington. Gramor Development commissioned a study in

2008 that estimated the expected tax generation from the development to the City of Vancouver.<sup>1</sup> The analysis estimated as much as \$38.3 million in one-time revenues through the real estate excise tax (REET), with an additional \$7.7 million in sales tax on construction. Annual recurring tax revenues were estimated at \$4.5 million (2008 dollars), which included property taxes, lodging related taxes, sales taxes and employee-based business taxes. The net present value of these estimated tax revenues was estimated at approximately \$80 million, discounted at 5.5%.

- We prepared a separate estimate of tax contributions by the project's construction and. Assuming a 2.5% annual rate of inflation, as well as a 5.5% discount factor, the net present value of the tax contributions from the development over a twenty year period would be over \$96 million dollars for the State of Washington as well as local jurisdictions. Sales and property tax revenues would be expected to provide the largest contributions.
- The impacted program would reduce projected revenues by over \$9.3 million from construction, most notably through a reduction in sales and property taxes.

**State and Local Tax Impact by Total: Construction Period Impact**

Description	Total
Dividends	(\$12,198)
Social Ins Tax- Employee Contribution	(\$26,594)
Social Ins Tax- Employer Contribution	(\$47,144)
Tax on Production and Imports: Sales Tax	(\$5,268,238)
Tax on Production and Imports: Property Tax	(\$2,388,010)
Tax on Production and Imports: Motor Vehicle Lic	(\$68,006)
Tax on Production and Imports: Severance Tax	(\$14,436)
Tax on Production and Imports: Other Taxes	(\$617,335)
Tax on Production and Imports: S/L NonTaxes	(\$295,689)
Personal Tax: NonTaxes (Fines- Fees	(\$380,142)
Personal Tax: Motor Vehicle License	(\$119,034)
Personal Tax: Property Taxes	(\$40,162)
Personal Tax: Other Tax (Fish/Hunt)	(\$45,141)
<b>Total State and Local Tax</b>	<b>(\$9,322,129)</b>

- On a sustained basis, this impact would be expected to be close to \$2.0 million per year in reduced tax generation.

<sup>1</sup> Updated Columbia Waterfront Tax Generation Analysis, E.D. Hovee & Company, August 1, 2008

**State and Local Tax Impact by Total: Ongoing Net Impact**

Description	Total
Dividends	(\$850)
Social Ins Tax- Employee Contribution	(\$7,960)
Social Ins Tax- Employer Contribution	(\$14,111)
Tax on Production and Imports: Sales Tax	(\$1,081,375)
Tax on Production and Imports: Property Tax	(\$490,171)
Tax on Production and Imports: Motor Vehicle Lic	(\$13,959)
Tax on Production and Imports: Severance Tax	(\$2,963)
Tax on Production and Imports: Other Taxes	(\$126,716)
Tax on Production and Imports: S/L NonTaxes	(\$60,694)
Personal Tax: NonTaxes (Fines- Fees)	(\$96,380)
Personal Tax: Motor Vehicle License	(\$30,180)
Personal Tax: Property Taxes	(\$10,183)
Personal Tax: Other Tax (Fish/Hunt)	(\$11,445)
<b>Total State and Local Tax</b>	<b>(\$1,946,987)</b>

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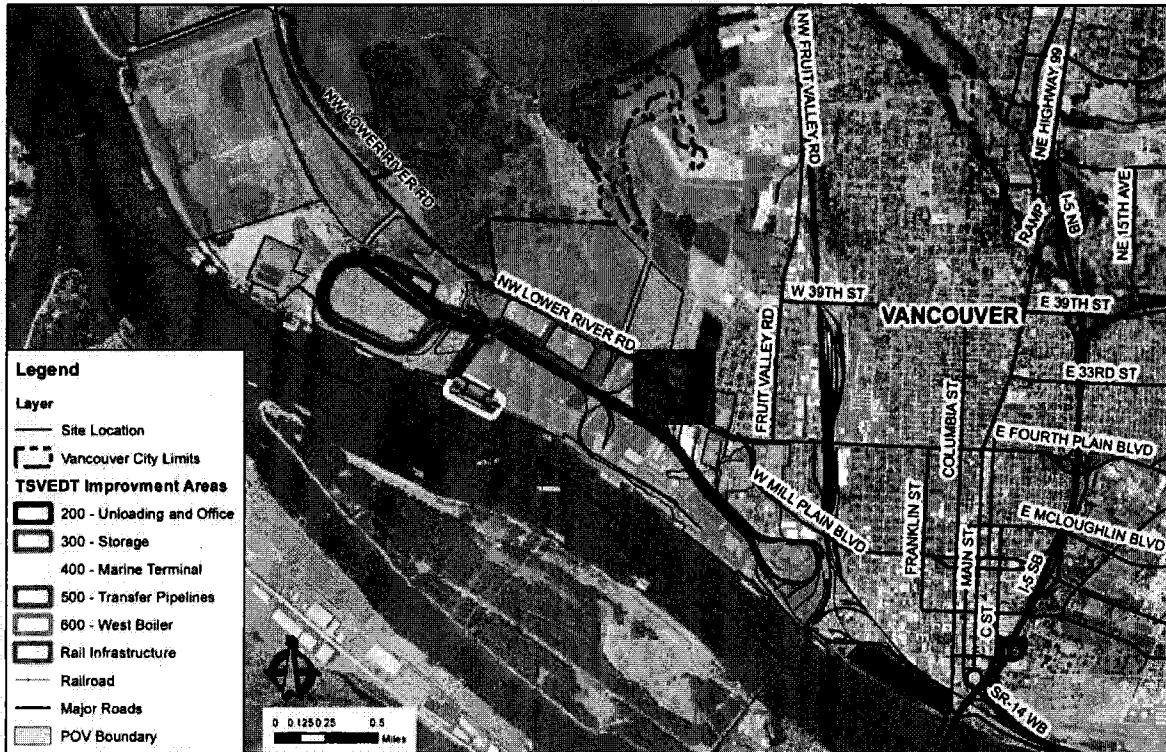
- The overall net present value of the revenue loss over the next twenty years would be \$28.9 million, assuming a 30% impact on investment, a 2.5% annual inflation rate and discount rate of 5.5%.
- While this analysis is largely limited to the Waterfront Vancouver project, it recognizes that impacts would be realized within the broader downtown area as well. The Waterfront Vancouver project is intended as a catalytic development, and is designed to enhance the development prospects for the remainder of downtown Vancouver. We would expect that the rate of development activity, investment in real property and property valuations would be negatively impacted. This impact would be in addition to that estimated by our analysis, and should be evaluated to truly gauge the economic impacts of the proposed Tesoro Savage facility.
- The Tesoro Savage EFSEC application estimates an economic impact of construction of 677 jobs, with labor income of \$43.6 million, well below the estimated construction impact of 2,154 jobs and \$105.9 million in labor income associated with just the Waterfront Vancouver development.<sup>2</sup> Operational employment estimates of 890 jobs and \$64.1 million in labor income from the Tesoro Savage facility compare more favorably to the Waterfront Vancouver impacts of 613 jobs and \$27.2 million in labor income, but it is important to remember that the Vancouver Waterfront development represents only a portion of the impact area that should be evaluated.
- Another consideration is the duration of activity. While the application addresses the operation of the oil depot as an ongoing entity, shipping crude oil by rail is intended to only be a temporary solution. The economics advantages of utilizing pipelines will likely limit the effective operational lifespan of this facility. As a result, the analysis should address the short term nature of the operation.

<sup>2</sup> EFSEC Application No. 2013-01, Socio-Economic Analysis, BST Associates

## II. PROJECT DESCRIPTION

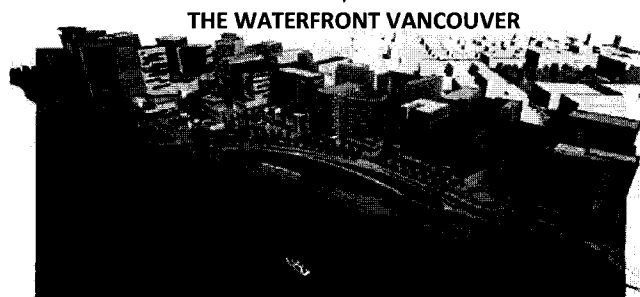
The proposed Tesoro Savage Vancouver Energy Distribution Terminal would be located on Port of Vancouver property within the City of Vancouver. While the application describes expected operational functions within the Port property, rail access to the facility would be routed along the northern edge of The Waterfront Vancouver, a major mixed use redevelopment site immediately southeast of the Port properties.

FIGURE 1.1: GENERAL VICINITY MAP



Source: Applicant Materials

The construction and ongoing operation of the proposed Tesoro facility would be expected to have a substantial impact on the achievable pricing and subsequent character of development in The Waterfront development, as well as in the broader City of Vancouver Central Business District (CBD). When fully operational, the facility will generate a significant level of train traffic along the rail line spur immediately north of The Waterfront, which will generate noise, visual impacts as well as an increased level of risk associated with the explosive nature of the cargo being transported.



### III. AREAS OF IMPACT

#### A. ECONOMIC IMPACTS

While the application presents a cursory analysis of the economic impacts of construction and operation of the Tesoro Savage facility, the analysis is substantially incomplete as it does not reflect the impact of associated rail traffic heavily impacted properties located along the Port’s rail spur, most notably The Waterfront development. The traffic volume on the spur associated with operation of the facility is expected to have a significant detrimental impact on Waterfront Vancouver site, generating significant noise, visual impact and real and perceived risk associated with the explosive nature of the cargo. These negative impacts would be expected to have a significantly negative impact on both achievable pricing for residential and commercial tenants, reduce the pace of absorption and reduce the attractiveness of the location from an investment perspective, increasing the yields necessary to induce investment (reflected in higher capitalization rates). This is expected to substantially impact the magnitude and character of development in the area.

**TABLE 3.1: ECONOMIC IMPACTS ASSOCIATED WITH THE TESORO-SAVAGE OIL TERMINAL RAIL TRAFFIC**

<ul style="list-style-type: none"> <li>▪ Reduced Pricing</li> <li>▪ Higher Cap Rates</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced level and pace of construction in The Waterfront</li> <li>▪ Reduced level and pace of construction in Vancouver CBD</li> </ul>
<ul style="list-style-type: none"> <li>▪ Reduced Absorption</li> </ul>	<ul style="list-style-type: none"> <li>▪ Less efficient utilization of infrastructure investments</li> </ul>
<ul style="list-style-type: none"> <li>▪ Loss of Catalytic Effect</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced overall level and pace of construction and redevelopment in the Vancouver CBD</li> </ul>
<ul style="list-style-type: none"> <li>▪ “Green” Development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Impacts associated with “smart development” and achieving a more compact urban form.</li> </ul>

The economic impacts outlined above were estimated by comparing predicted development outcomes in the area under a “no action” scenario with predicted outcomes assuming operation of the Tesoro Savage facility. While impacts were estimated for the Waterfront Vancouver development, this development is designed and expected to have a catalytic effect on the broader Vancouver CBD, and to the extent that the development is reduced in scope, negative economic impacts would also be expected within the broader context.

To model the economic impacts of various activities, Johnson Economics utilized IMPLAN (IMPact for PLANning)<sup>3</sup> input/output multiplier model methodology. Developed by the Forest Service to assist in land and resource management planning, IMPLAN is an economic impact model designed for analyzing the effects of industry activity (employment, income or business revenues) upon all other industries in an economic area.

#### IMPLAN MODELING SYSTEM DYNAMICS<sup>4</sup>

##### Social Accounting Matrices

Regional Social Accounting Matrices, or SAMs, represent an IMPLAN extension for regional economic modeling. SAMs provide information on non-market financial flows. IMPLAN type inter-industry models provide information on market transactions between firms and consumers, and they capture payments of taxes by individuals and

<sup>3</sup> Minnesota IMPLAN Group (MIG), Stillwater, Minnesota

<sup>4</sup> Derived from materials provided by MIG Inc.

businesses, transfers of government funds to people and businesses, and transfer of funds from people to people.

### **IMPLAN Multipliers**

Social Accounting Matrices can be constructed to show the effects of a given change on the economy of interest. These are called Multiplier Models. Multiplier Models study the impacts of a user—specified change in the chosen economy for 440 different industries. Because the Multiplier Models are built directly from the region specific Social Accounting Matrices, they will reflect the region's unique structure and trade situation.

Multiplier Models are the framework for building impact analysis questions. Derived mathematically, these models estimate the magnitude and distribution of economic impacts, and measure three types of effects that are displayed in the final report. These are the direct, indirect, and induced changes within the economy.

### **Impacts Defined**

***Direct Impacts:*** The actual change in activity affecting a local economy. For example, if a new institutional building is constructed, direct economic impacts comprise the value added output for that firm/user, as well as the jobs required by that business and the labor income paid.

***Indirect Impacts:*** The response of all other local businesses within the geographic area to the direct impact. Continuing the previous example, indirect impacts of a new institutional user would comprise revenues for related vendors, i.e. real estate services, vendors, etc., and the jobs and labor income thereby generated.

***Induced Impacts:*** The response of households within the geographic area affected by direct and indirect impacts. In the given example, induced impacts would be the increase in all categories of spending by households in the geography directly or indirectly employed by the businesses' activities.

Each of these steps recognizes an important leakage from the economic study region spent on purchases outside of the defined area. Eventually these leakages will stop the cycle. Our analysis will evaluate the Jobs, Labor Income, and Value-Added Output of our estimated direct industry change and commodity change activities.

### **Glossary of Terms<sup>5</sup>**

***Value Added Output:*** The difference between an industry's or an establishment's total output and the cost of its intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus (formerly "other value added").

***Labor Income:*** All forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income.

***Industry:*** A group of establishments engaged in the same or similar types of economic activity.

***Commodity:*** A commodity is a product or service. It may be produced by one or by many industries. Commodity output represents the total output of the product or service, regardless of the industry that produced it. If an industry and the commodity produced by the industry have the same name, the commodity is considered to be the primary product of that industry. Any other commodity produced by that industry is a secondary product

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<sup>5</sup> From the United States Bureau of Economic Analysis (BEA)

of that industry.

**Geographic Level**

Impact analysis has varying degrees of geographic breadth. Specifically, vendors who provide goods and services in response to varying impacts are located in varying locales. For this analysis, we focused only on impacts retained in Clark County, Washington. That is, indirect and induced impacts which leak outside of the county are not included. We anticipate the rate of leakage to be low, as on an on-going basis industries impacted by the expected development are more service oriented with a higher likelihood of local retention.

**ECONOMIC IMPACTS OF CONSTRUCTION ACTIVITY**

As noted previously, our approach to this analysis is to model the economic impacts of the development program as currently planned, model an alternative development program reflecting what is viable under an impacted scenario assuming the Tesoro Savage facility, and reconcile these two outcomes to arrive at the estimated marginal impact of the facility. It is important to note that the impact on development within the Waterfront Vancouver project represents only a portion of the impact, as this project is expected to significantly alter the development trajectory of the broader downtown Vancouver area.

The current development program for the Waterfront Vancouver is summarized as follows:

			<b>Cost/ Unit</b>	<b>Construction Costs</b>
<b>Residential Units</b>				
<i>Rental Apartments</i>	1,500	Units	\$135,000	\$202,500,000
<i>Condominiums</i>	1,421	Units	\$160,000	\$227,360,000
<b>Office Space</b>	800,000	SF	\$175	\$140,000,000
<b>Retail Space</b>	166,400	SF	\$175	\$29,120,000
<b>Hotel</b>	318	Keys	\$125,000	\$39,750,000
<b>Parking</b>	5,172	Spaces	\$30,000	\$155,154,000
<b>Infrastructure</b>				\$25,000,000
<b>Total</b>				<b>\$818,884,000</b>

In addition, the master plan includes a number of public spaces, including plazas and parks, which would entail significant construction costs.





To evaluate the temporary construction impacts of each scenario, we calculated the **total** construction spending of the project measured as a direct industry change in construction of new residential and nonresidential commercial structures. The baseline scenario reflected the program in the current master plan, while the second scenario assumed a 30% reduction in development yield on the site.

The baseline scenario reflects assumptions consistent with the current program for the site. Estimated construction expenditures and associated real estate commissions and fees were converted into estimated contributions to employment income and output at the Clark County level.

- Construction spending would translate into over 4,580 direct full time equivalent (FTE) jobs over the construction period, these jobs would pay an estimated \$244 million in labor income (\$53,400 per employee), and contribute \$318 million in value-added output.
- The associated indirect and induced impacts would create an additional 2,600 FTE jobs, \$108 million in labor income, and \$187 million in value-added output.
- The total impact on output for the Clark County economy would be over \$927 million.
- The top industries affected by construction activity include construction, architectural and engineering firms, food service and drinking places, and real estate establishments.

**Impact Summary Waterfront Vancouver Construction**

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	4,580.5	\$244,901,670	\$318,231,501	\$608,533,003
Indirect Effect	1,244.5	\$51,792,862	\$82,243,288	\$147,303,477
Induced Effect	1,356.6	\$56,410,957	\$104,783,289	\$171,645,375
Total Effect	7,181.6	\$353,105,489	\$505,258,078	\$927,481,855

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**ECONOMIC IMPACTS OF ON-GOING ACTIVITY**

The economic impacts of on-going activity are the permanent annual impacts resulting from the completed construction of the development and resulting "business activities". Upon completion, employment at businesses located at Waterfront Vancouver would be expected to total over 1,360 employees, while almost 700 employees would be supported by the direct employment at the development.

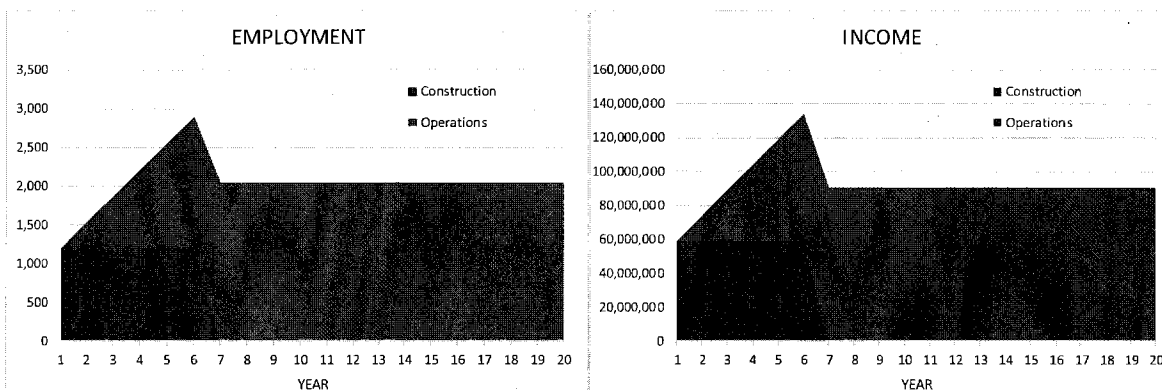
- Direct employment of 1,364 jobs is expected to contribute \$64.8 million in labor income and \$59.6 million in value-added output to the Clark County economy.
- Associated indirect and induced impacts are expected to create an additional 679 permanent jobs paying \$25.9 million in labor income.
- The total annual output associated with the ongoing operations at Waterfront Vancouver would be expected to be in excess of \$185.5 million per year.
- While the construction impacts represent temporary impacts, these impacts would be expected to accrue annually and be sustained into the foreseeable future.

**Impact Summary Waterfront Vancouver Annual Operations**

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	1,364.4	\$64,761,761	\$59,615,566	\$108,952,688
Indirect Effect	332.2	\$11,454,305	\$19,030,619	\$32,611,882
Induced Effect	347.2	\$14,458,740	\$26,818,041	\$43,953,404
Total Effect	2,043.8	\$90,674,806	\$105,464,226	\$185,517,973

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The expected economic impact of the development on Clark County would be expected to be realized initially through construction, but on an ongoing basis beyond that from the operation of businesses and expenditures of residents in the development.



## IMPACTS ASSUMING REDUCED DEVELOPMENT PROGRAM

The operation of the proposed Tesoro Savage facility would be expected to negatively impact achievable pricing, the pace of absorption and acceptable developer returns. As a direct result, the resulting pattern and pace of development at the Waterfront Vancouver would be expected to be substantially impacted. Based on previous analyses of a similar range of expected impacts, a reduction in the overall development program of approximately 30% would be a reasonable expectation of impact.

We evaluated a reduction in the overall program based on this assumption, to assess the net impact associated with the Tesoro Savage development. As before, this evaluates only the impact of the Waterfront Vancouver development, and subsequently does not account for the broader expected impact on the greater downtown Vancouver area.

The reduced program assumptions were run through the IMPlan model, yielding the following impacts for construction and ongoing operations.

### Impact Summary Waterfront Vancouver Impacted Construction

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	3,206.3	\$171,431,169	\$222,762,050	\$425,973,102
Indirect Effect	871.2	\$36,255,003	\$57,570,302	\$103,112,434
Induced Effect	949.6	\$39,487,670	\$73,348,303	\$120,151,763
Total Effect	5,027.1	\$247,173,842	\$353,680,655	\$649,237,298

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### Impact Summary Waterfront Vancouver Impacted Annual Operations

ImpactType	Employment	LaborIncome	TotalValueAdded	Output
Direct Effect	955.1	\$45,333,232	\$41,730,896	\$76,266,881
Indirect Effect	232.5	\$8,018,014	\$13,321,434	\$22,828,317
Induced Effect	243.0	\$10,121,118	\$18,772,629	\$30,767,383
Total Effect	1,430.6	\$63,472,364	\$73,824,958	\$129,862,581

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The net differential would be over 2,100 FTE jobs associated with construction, with an additional 613 jobs on an ongoing annual basis. The net impact on overall output would be expected to be close to \$280 million for construction, with an additional impact of \$55.7 million per year associate with ongoing operations.

## B. FISCAL IMPACTS

In addition to economic impacts, the impact would be expected to also have fiscal implications for the City of Vancouver, Clark County and the State of Washington. Gramor Development commissioned a study in 2008 that estimated the expected tax generation from the development to the City of Vancouver.<sup>6</sup> The analysis estimated as much as \$38.3 million in one-time revenues through the real estate excise tax (REET), with an additional \$7.7 million in sales tax on construction. Annual recurring tax revenues were estimated at \$4.5 million (2008 dollars), which

<sup>6</sup> Updated Columbia Waterfront Tax Generation Analysis, E.D. Hovee & Company, August 1, 2008

included property taxes, lodging related taxes, sales taxes and employee-based business taxes. The net present value of these estimated tax revenues was estimated at approximately \$80 million, discounted at 5.5%.

As part of our analysis, we prepared a separate estimate of tax contributions by the project's construction and operation based on the modeling assumptions in the IMPlan scenarios. The following tables summarize the estimated tax contributions during the construction period, as well as ongoing operations.

**State and Local Tax Impact by Total: Construction Period**

Description	Total
Dividends	\$40,661.00
Social Ins Tax- Employee Contribution	\$88,647.00
Social Ins Tax- Employer Contribution	\$157,147.00
Tax on Production and Imports: Sales Tax	\$17,560,792.00
Tax on Production and Imports: Property Tax	\$7,960,034.00
Tax on Production and Imports: Motor Vehicle Lic	\$226,687.00
Tax on Production and Imports: Severance Tax	\$48,119.00
Tax on Production and Imports: Other Taxes	\$2,057,784.00
Tax on Production and Imports: S/L NonTaxes	\$985,631.00
Personal Tax: NonTaxes (Fines- Fees	\$1,267,140.00
Personal Tax: Motor Vehicle License	\$396,780.00
Personal Tax: Property Taxes	\$133,873.00
Personal Tax: Other Tax (Fish/Hunt)	\$150,471.00
<b>Total State and Local Tax</b>	<b>\$31,073,764.00</b>

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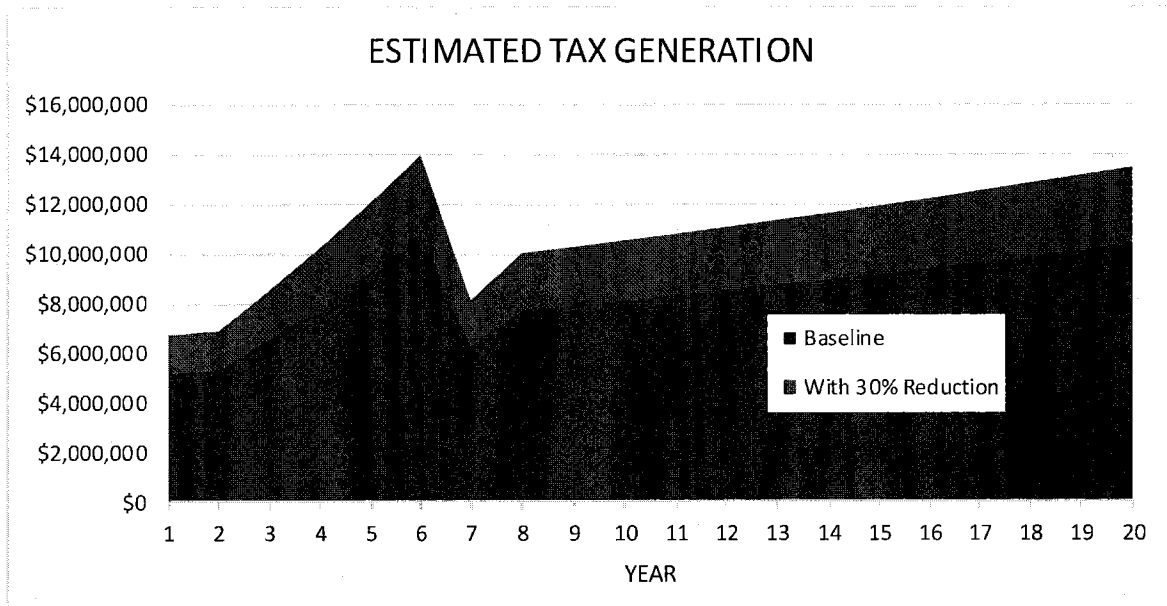
**State and Local Tax Impact by Total: Ongoing**

Description	Total
Dividends	\$2,833.00
Social Ins Tax- Employee Contribution	\$26,533.00
Social Ins Tax- Employer Contribution	\$47,036.00
Tax on Production and Imports: Sales Tax	\$3,604,583.00
Tax on Production and Imports: Property Tax	\$1,633,902.00
Tax on Production and Imports: Motor Vehicle Lic	\$46,530.00
Tax on Production and Imports: Severance Tax	\$9,877.00
Tax on Production and Imports: Other Taxes	\$422,387.00
Tax on Production and Imports: S/L NonTaxes	\$202,314.00
Personal Tax: NonTaxes (Fines- Fees	\$321,268.00
Personal Tax: Motor Vehicle License	\$100,599.00
Personal Tax: Property Taxes	\$33,942.00
Personal Tax: Other Tax (Fish/Hunt)	\$38,150.00
<b>Total State and Local Tax</b>	<b>\$6,489,955.00</b>

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Assuming a 2.5% annual rate of inflation, as well as a 5.5% discount factor, the net present value of the tax contributions from the development over a twenty year period would be over \$96 million dollars for the State of Washington as well as local jurisdictions. Sales and property tax revenues would be expected to provide the largest contributions.

Assuming a reduced product program outcome at the site, the direct tax impacts would be expected to be impacted proportionately. As a result, the net present value of the revenue loss would be \$28.9 million assuming a 30% impact on investment.



In addition, the impact on the broader downtown area would magnify this negative impact, as development activity, investment in real property and property valuations would be negatively impacted.



JOHNSON  
ECONOMICS

Exhibit E

**PREDICTED IMPACTS  
OF THE TESORO SAVAGE FACILITY ON  
DEVELOPMENT AND REDEVELOPMENT  
IN DOWNTOWN VANCOUVER, WASHINGTON**

DECEMBER 18, 2013

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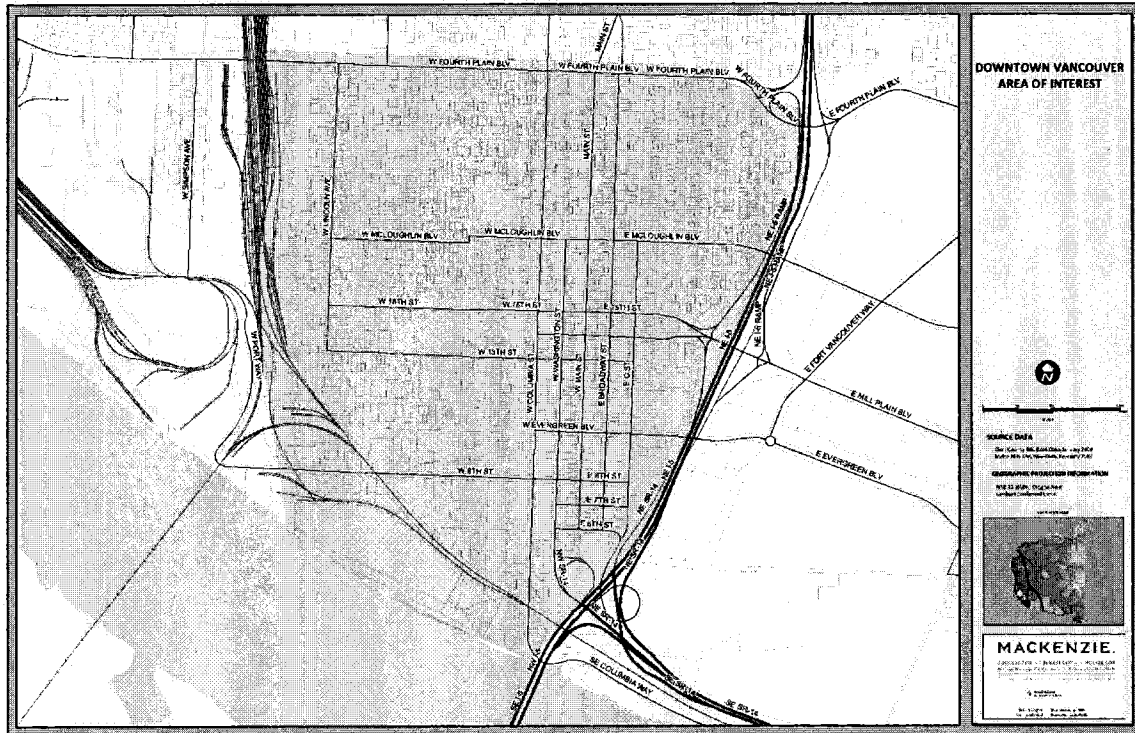
## I. EXECUTIVE SUMMARY

- The proposed Tesoro Savage Vancouver Energy Distribution Terminal is predicted to have a substantive impact on development pattern in downtown Vancouver. This is attributable to an expected negative impact on development patterns in the Waterfront Vancouver project, which would be expected to impact achievable pricing and capitalization rates in the broader downtown market.
- In order to estimate the predicted impact of the new facility on the broader area, Johnson Economics utilized a predictive development/redevelopment model. This model translates assumption with respect to current and anticipated market conditions into predicted development outcomes. The impact of the Tesoro facility was calculated based on a reconciliation of predicted outcomes with and without the facility.
- The predicted impact of the facility on the downtown Vancouver study area would be as follows:
  - \$98.3 million reduction in new construction investment
  - 341,000 square feet reduction in commercial space
  - A net change of \$138.1 million reduction in Real Market Value
- The implications of this loss would include significant losses in employment, tax revenues and less efficient utilization of infrastructure investments



## II. PROJECT DESCRIPTION

This report evaluates the anticipated impacts on development and redevelopment activity within downtown Vancouver, in a study bounded by Fourth Plain to the north, I-5 to the east. The main objective of this project is the development of a predictive computer-based model (Model) which projects the potential development and redevelopment activity within the study area.



This memorandum describes the process undertaken to inform and build the Model, provides an overview of the Model's methodology, and discusses the results of test runs of the Model on the study area.

## III. MODEL RUN

### A. MODEL DESCRIPTION

The Model designed during this process is an Excel-based model which aims to translate user inputs on existing conditions in the study area into an estimate of the magnitude of new development to be expected over the planning period. The Model uses pro forma analysis to project the "highest and best" economic uses which are feasible and permissible by zone, and determine if the value of that type of development would justify the redevelopment of individual parcels based on their current value. There are additional considerations in determining the overall highest and best use of land from a community and planning perspective, but this Model focuses on the economic component which is most relevant to private developers.

The Model provides a “baseline” projection of development assuming current conditions and trends, and a projection assuming the Tesoro facility is built and operated as described in their submittal materials. The results of the two scenarios are then compared to get an estimate of how much the facility may impact economic development activity over normal baseline predictions.

Precisely quantifying future activity in a broad real estate marketplace with thousands of different property owners, businesses, and other interests, and differing levels of public involvement, is of course impossible. Therefore, while this Model does provide specific quantified estimates, *it is best to think of the results as a broader estimate of the relative magnitude of economic development* under the two scenarios.

More detail on the methodology used in the Model is included in Section VI of this report.

## **B. GENERAL IMPLICATIONS AND ASSUMPTIONS**

- The Model reflects our expert opinion that the proposed facility will substantively impact development activity in downtown Vancouver, reducing achievable pricing as well as increasing perceived development risk.
- The Model produces quantified outputs of multiple measures of development activity: construction investment, new housing units, new commercial space, and new real market value. It is inherent to the design of the Model to produce precise numerical results of these measure. However, it is impossible to accurately predict development activity with such precision over any period of time.
- **Therefore, it is important to remember that the results of this Model are best considered as an indicator of the estimated magnitude of impact from proposed facility.** In other words, the more useful conclusion would be “the new facility may reduce housing production by around 15%”, rather than “the facility will lead to an additional 437 units.” The first provides useful reference for discussion, while the second is almost certain to prove untrue because it is overly precise.
- In a related point, the results from this Model can be presented in the form of a range. Because the Model allows calibration, it can be used to adjust assumptions and test results under different scenarios.
- The Model uses specific parcel-level data to generate quantified measures of predicted development activity, but it is important to remember that this Model is actually generating a broad study-area-wide estimate of development activity. In no cases should this Model be used to reach definitive conclusions about what will happen on any given parcel. Any data provided that identifies parcels, be it in map or data base form, must specify that *it is making no firm predictions or guarantees on the eventual development or lack of development on specific properties.*
- Because the Model is an indicator of broader “bulk” trends in the study area, it may actually provide a better approximation over a longer period of time. While a five or even ten year period will be highly dependent on the current and near-term trends in the real estate development environment, a longer period of fifteen to twenty years will include more swings in the market cycle, and thus average out these ups and downs.

### C. GENERAL APPROACH

The Model is structured to measure predicted changes in investment pattern associated with impacts to key variables in the development equation. Key inputs in the “production” model are those that impact revenues, costs, return parameters and site entitlements.

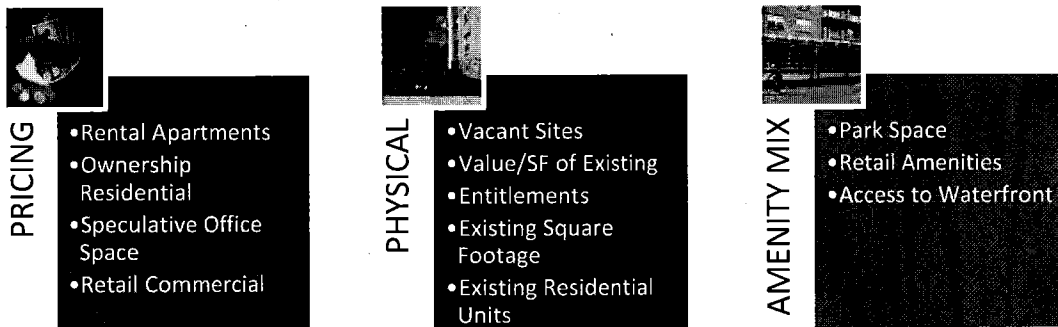
The Model is predicated on an assumption that the operation of the proposed Tesoro facility will substantively impact a number of variables that influence the perceived development environment, triggering a predictable response in the market. The production model will convert marginal shifts in assumptions with respect to these variables into changes in supportable residual land values and in some instances development forms.

The production component of the model can be broken up into three primary categories that help determine final development form: achievable pricing, cost to develop, and threshold returns. Shifts in these inputs can alter associated patterns of investment. In this model, the proposed facility is assumed to impact some of these inputs, and therefore alter investment and development patterns.

A key objective of the Model is to develop a theoretical construct within which to evaluate the impact of the shift in assumptions on the anticipated development and investment patterns within impacted areas. The Model generates a profile of predicted development activity representing a “baseline” scenario, and a scenario assuming the proposed new facility, in order to measure the net impact.

### D. LOCAL VARIABLES

This component of the model incorporates the characteristics of specific study areas. The variables include information on pricing, amenities and physical property characteristics at the parcel level.



#### Pricing

Assumptions with respect to current pricing in the area, reflecting the estimated anticipated pricing for new product by category, would need to be generated as an input. This would include per square foot rental rates for rental apartments, sales prices per square foot for ownership residential units, and net lease rates per square foot for office and retail space. In addition, assumptions with respect to achievable pricing for parking spaces would be developed. These variables should be set to reflect the achievable pricing that a developer would assume for a new construction project in the area being studied.

The current achievable pricing structure is an important variable to consider in predicting the marginal impact of any changes in the development environment, as it is a significant factor in determining the form of development as well as developing supportable residual property values in the district. While the pricing experience of new comparable projects can be a strong predictor of achievable pricing, in many markets there may be limited or no new product to establish a reliable price. Nonetheless, an assumption of current achievable pricing in a study area will be necessary to run the model.

### Physical Characteristics

As with pricing, the physical characteristics of prospective corridors will be a major factor in the predicted magnitude and character of redevelopment. The model incorporates an assessment of existing properties at the parcel level, for both improved as well as vacant sites. Inputs to the model include the following:

- The estimated Real Market Value (RMV) of Improved sites at the parcel level (This variable is used as a proxy for the market value of the site in and found in assessor records);
- Parcel size/square feet; and
- Current entitlements (zoning) by parcel.

Within the model, the attributes of individual parcels are used to predict the likelihood of redevelopment, with properties that have a high current value of improvements being more challenging to redevelop. The zoning entitlements by parcel is used as a screen, which limits potential redevelopment scenarios to those allowed under the zoning.

### Amenity Mix

The existing amenity mix reflects the current and anticipated level of amenity in the district, and should help to define the marginal impact of the proposed facility on the local amenity base. It is assumed by the Model that the new facility would decrease the local amenity base and reduce marketability, primarily through a more direct negative impact on the development patterns in Waterfront Vancouver.

## **E. DEVELOPMENT/REDEVELOPMENT MODULE**

The development/redevelopment module is intended to simulate the development decision tree, factoring the impact of the key inputs on decisions to undertake development activity. The model is based on a series of simplified pro formas for 27 theoretical development programs that characterize the relationship between key variables, predicted development form and associated residual property values. The module generates a generalized determination of the highest and best economic use based on the theoretical development programs, as well as an associated residual property value associated with each program. This information is reconciled with information on the existing inventory information and zoning, resulting in a predicted pattern of investment.

### Highest and Best Use

The module initially solves for a development solution that represents the highest and best use of the property under the assumptions used, as well as outputting an associated residual property value. The highest and best *economic* use of the site is defined as the *allowable* land use program that yields the greatest return to the existing property, and the residual property value reflects the maximum acquisition value supported by that program under the assumptions used. (There may be additional considerations in determining the *overall* highest and best use of land from a community and planning perspective, but this Model focuses on the economic component which is most relevant to private developers.)

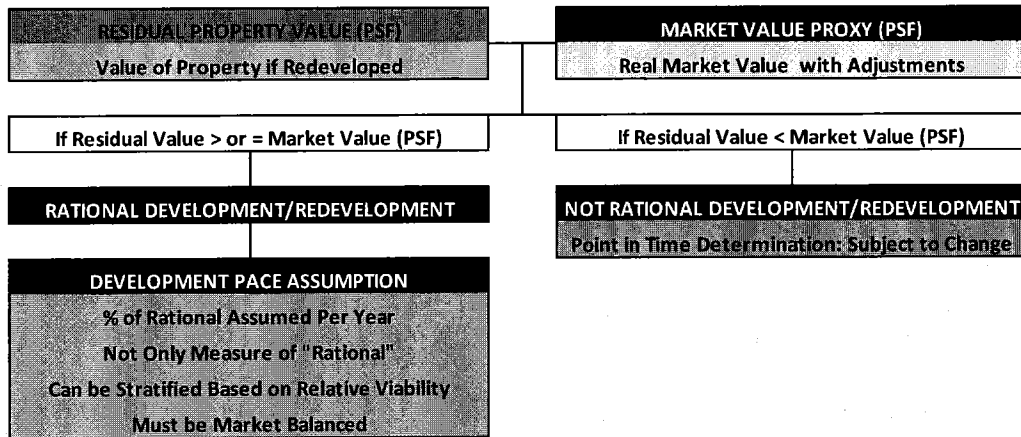
The highest and best use determination is based on the allowable use that has the highest indicated residual property value. The model currently incorporates a total of 27 theoretical development programs, but the number and nature of program options can be varied. An entitlement screen is necessary, as use types identified as having the greatest residual values may not be allowed under existing zoning. In the model, this is done using a matrix that evaluates whether or not the theoretical programs are allowable under the range of zoning codes in the study area. If the use is not allowed, the highest and best *allowed* use is determined.

### Threshold for Development

Development/redevelopment activity is predicted by the model when the residual property value exceeds the property value under the existing use. If the residual value is greater than or equal to the market value of the property, it is assumed to represent a rational development or redevelopment opportunity. I.e. a developer can

purchase the property at current market value, for its new intended purpose which places a greater value on the site.

### REDEVELOPMENT MODEL SCHEMATIC



While development and/or redevelopment is considered viable in these instances, it does not necessarily mean that it will be developed within the study time frame. There are a number of additional factors that impact redevelopment, and we assume that only a portion of opportunities identified as viable will be realized within the study horizon. The assumed rate of redevelopment should be based on historic trends in the study area, and is an input on the Initial Input Screen.

### F. MEASURES OF DEVELOPMENT IMPACTS (OUTPUTS)

The development/redevelopment module is run under baseline assumptions as well as assumptions reflecting the proposed Tesoro facility, and the comparison of the two scenarios provides the basis for estimating the net impact of the facility.

The net impacts associated with the facility are broken down in multiple categories. This includes predicted levels of new development, redevelopment as well as investment in existing structures. To determine the net impacts, the model solves for the differential between the two scenarios. The unit of measure include:

- The dollar value of construction and investment activity in physical improvements.
- Projected net change in real market value in the study area associated with new construction
- Net change in square footage of commercial space, as well as residential units in the study area.

The model does not address the direct, indirect and induced impact of the construction activity funded.

## G. BASELINE SCENARIO

The following page shows the estimate of development activity resulting from the assumed baseline scenario. This is the Model's output, resulting from the baseline assumptions of market conditions. The tables summarize the predicted development output for the "Baseline Scenario" of the study area.

- The table in the upper left shows the square footage of land area in each RMV/Residual ratio category.
- This total area is multiplied by the Development Probability.
- This produces the table just below, which is the bulk estimate of developable lands in the study area. In this example, the "< 0.75" category is multiplied by 20%. The categories where RMV/Residual is greater than 2.0 are determined to have low likelihood of redevelopment, so 0% of the land area in those categories pass through this screen.
- The determination of predicted development land area by zone is then compared to the highest and best economic use in those zones to estimate the amount of **construction investment**, **housing units** and **commercial space** resulting from that development.
- Finally, the change in **Real Market Value** is calculated both from new development, and renovation/reinvestment in existing properties.

As modeled, the Baseline Scenario forecast produced an estimate of:

- \$194.1 million in new construction investment
- 915 new housing units
- 387,000 square feet of commercial space
- \$224.7 million in new Real Market Value
- A net change of \$381.5 million in Real Market Value

This is an example of the Baseline Scenario outputs. The next steps in the model are to produce similar outputs for the Tesoro facility Scenario, then compare the two sets of results to judge what additional impact the Tesoro facility is predicted to have.

**PREDICTED DEVELOPMENT ACTIVITY – BASELINE SCENARIO  
PREDICTIVE ECONOMIC DEVELOPMENT MODEL**

ZONING	SQUARE FEET OF LAND (Scale Adjusted)					Total
	RMV/Residual Category					
	<75	75-1.25	1.25-2.0	2.0-4.0	>4.0	
R-9	0	0	0	0	4,841,969	4,841,969
R-18	56,716	3,593	0	0	60,310	60,310
R-22	143,728	3,593	0	10,000	157,321	157,321
R-30	13,503	0	0	0	0	0
R-35	0	0	0	0	0	0
CN	7,500	0	0	0	7,500	7,500
IH	0	0	0	0	2,059,828	2,059,828
IL	179,026	39,203	44,866	0	263,094	263,094
OCI	337,661	119,788	53,615	0	511,063	511,063
CX	6,299,551	899,242	900,282	789,993	329,688	9,218,755
CC	575,510	427,353	298,614	69,302	1,301	1,372,080
Park	0	0	0	0	367,527	367,527
<b>TOTAL</b>	<b>7,613,195</b>	<b>1,492,772</b>	<b>1,297,376</b>	<b>869,295</b>	<b>7,600,312</b>	<b>18,859,446</b>

Dev Probability	20%	15%	10%	0%	0%	10%

ZONING	LAND DEVELOPED/REDEVELOPED (SF)					Total
	RMV/Residual Category					
	<75	75-1.25	1.25-2.0	2.0-4.0	>4.0	
R-9	0	0	0	0	0	0
R-18	11,343	539	0	0	0	11,882
R-22	28,746	539	0	0	0	29,284
R-30	2,701	0	0	0	0	2,701
R-35	0	0	0	0	0	0
CN	1,500	0	0	0	0	1,500
IH	0	0	0	0	0	0
IL	35,805	5,880	4,487	0	0	46,172
OCI	67,532	17,968	5,361	0	0	90,862
CX	1,259,910	134,886	90,028	0	0	1,484,825
CC	115,102	64,103	29,861	0	0	209,066
Park	0	0	0	0	0	0
<b>TOTAL</b>	<b>1,522,639</b>	<b>223,916</b>	<b>129,738</b>	<b>0</b>	<b>0</b>	<b>1,876,292</b>

ZONING	Predicted Prebimhant Development Form	Predicted Development Yield		RMV/ Dev. or Rehev.	Current RMV	Net Change in RMV
		Construction Investment	Residential Units			
R-9	N/A	\$0	0	0	\$0	\$0
R-18	3-story wood townhome	\$926,815	7	0	\$522,979	\$930,685
R-22	3-story wood townhome	\$2,284,190	17	0	\$1,065,354	\$2,517,040
R-30	3-story wood townhome	\$210,647	1	0	\$16,680	\$313,686
R-35	3-story wood townhome	0	0	0	0	0
CN	3-story wood townhome	\$117,000	0	0	\$65,180	\$118,316
IH	N/A	0	0	0	0	0
IL	office low rise	\$2,400,951	0	16,622	\$480,865	\$3,556,279
OCI	office low rise	\$4,724,812	0	32,710	\$1,093,720	\$6,850,943
CX	3-story wood townhome	\$115,816,326	890	0	\$51,740,135	\$129,899,611
CC	office mid/podium	\$67,653,871	0	337,642	\$7,300,345	\$80,467,180
Park	N/A	0	0	0	0	0
<b>TOTAL</b>		<b>\$194,134,611</b>	<b>915</b>	<b>386,974</b>	<b>\$62,285,258</b>	<b>\$224,653,641</b>
<b>TOTAL/REHAB/RENOVATION</b>						<b>\$156,865,095</b>
<b>OVERALL TOTAL</b>						<b>\$381,518,735</b>

Source: Johnson Reid LLC

## H. RECONCILIATION BASELINE AND TESORO FACILITY SCENARIOS

The Scenario with the Tesoro facility utilized the same model, but with an assumption of a 15% reduction in achievable rent levels and a 10% increase in capitalization rates. The Model produces a Development Activity Output screen for the Tesoro Facility Scenario that matches that of the Baseline Scenario. The two scenarios are then compared to determine the net impact of the proposed facility.

The following table presents the comparison of results from the reconciliation. In this case, the new facilities construction and operation are expected to have a negative impact on all indicators, decreasing investment, production of housing and commercial space, and resulting change in Real Market Value.

### RECONCILIATION OF BASELINE AND TESORO FACILITY SCENARIOS

BASELINE							
Predicted Predominant Development Form	Predicted Development Yield			RMV/ Dev. or Redev.	Current RMV	Net Change in RMV	
	Construction Investment	Residential Units	Commercial Space				
N/A	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$926,815	7	0	\$1,453,563	\$522,979	\$930,585	
3-story wood townhome	\$2,284,190	17	0	\$3,582,394	\$1,065,354	\$2,517,040	
3-story wood townhome	\$210,647	1	0	\$330,366	\$16,680	\$313,686	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
type v/podium	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$117,000	0	0	\$183,496	\$65,180	\$118,316	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
N/A	\$0	0	0	\$0	\$0	\$0	
office low rise	\$2,400,951	0	16,622	\$4,037,144	\$480,865	\$3,556,279	
office low rise	\$4,724,812	0	32,710	\$7,944,663	\$1,093,720	\$6,850,943	
3-story wood townhome	\$115,816,326	890	0	\$181,639,746	\$51,740,135	\$129,899,611	
MU res/ret 3-story wood w/surf LG	\$67,653,871	0	337,642	\$87,767,526	\$7,300,345	\$80,467,180	
N/A	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
<b>TOTAL/NEW CONSTRUCTION</b>	<b>\$194,134,611</b>	<b>915</b>	<b>386,974</b>	<b>\$286,938,898</b>	<b>\$62,285,258</b>	<b>\$224,653,641</b>	
<b>TOTAL/REHAB/RENOVATION</b>	<b>\$156,865,095</b>					<b>\$156,865,095</b>	
<b>OVERALL TOTAL</b>	<b>\$350,999,706</b>					<b>\$381,518,735</b>	

WITH OIL DEPOT OPERATIONS							
Predicted Predominant Development Form	Predicted Development Yield			RMV/ Dev. or Redev.	Current RMV	Net Change in RMV	
	Construction Investment	Residential Units	Commercial Space				
N/A	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$809,637	6	0	\$988,127	\$441,617	\$546,510	
3-story wood townhome	\$2,146,605	16	0	\$2,619,837	\$967,427	\$1,652,410	
3-story wood townhome	\$210,647	1	0	\$257,085	\$16,680	\$240,405	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
type v/podium	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$102,375	0	0	\$124,944	\$51,885	\$73,059	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
N/A	\$0	0	0	\$0	\$0	\$0	
office low rise	\$2,065,722	0	14,301	\$2,952,444	\$281,250	\$2,671,194	
office low rise	\$3,802,737	0	26,327	\$5,435,082	\$654,105	\$4,780,977	
3-story wood townhome	\$100,831,471	775	0	\$123,060,389	\$33,745,585	\$89,314,804	
MU res/ret 3-story wood w/surf LG	\$5,999,861	58	5,454	\$8,396,560	\$1,021,551	\$7,375,009	
N/A	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
3-story wood townhome	\$0	0	0	\$0	\$0	\$0	
<b>TOTAL/NEW CONSTRUCTION</b>	<b>\$115,969,054</b>	<b>856</b>	<b>46,082</b>	<b>\$143,834,468</b>	<b>\$37,180,100</b>	<b>\$106,654,368</b>	
<b>TOTAL/REHAB/RENOVATION</b>	<b>\$136,761,173</b>					<b>\$136,761,173</b>	
<b>OVERALL TOTAL</b>	<b>\$252,730,227</b>					<b>\$243,415,541</b>	

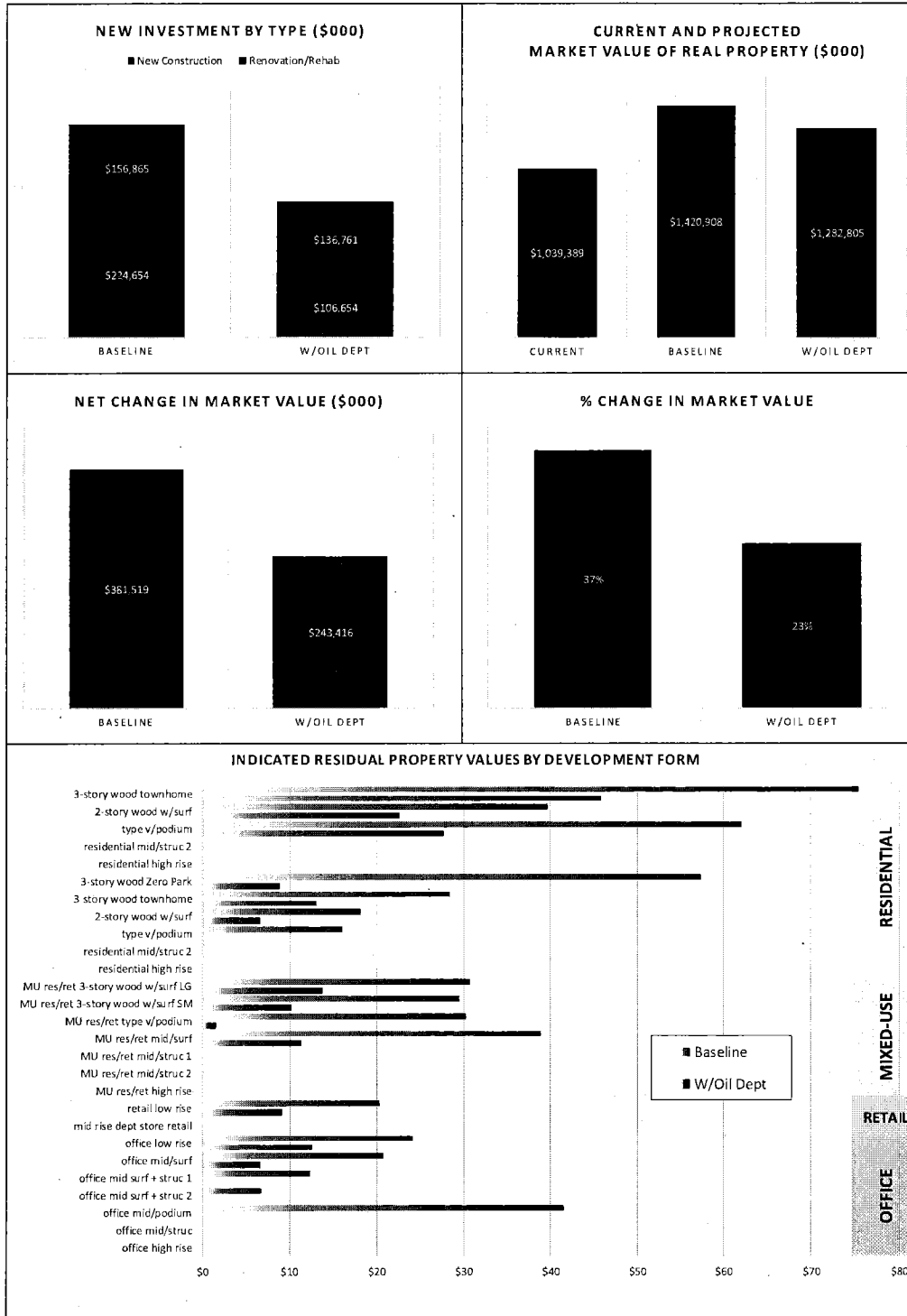
<b>NET DIFFERENTIAL</b>	<b>(\$98,269,479)</b>	<b>-59</b>	<b>-340,892</b>	<b>(\$143,104,430)</b>	<b>(\$25,105,158)</b>	<b>(\$138,103,194)</b>
-------------------------	-----------------------	------------	-----------------	------------------------	-----------------------	------------------------

Source: Johnson Reid LLC



The following is a summary of predicted impacts in graphical form:

**SUMMARY OF MODEL OUTPUT  
MAGNITUDE OF INVESTMENT AND RESIDUAL PROPERTY VALUES**



## Exhibit F: Additional Environmental Factors

The following factors must also be fully assessed in the EIS for the Tesoro-Savage oil terminal:

- **Climate Change**
  - *Scope 1:* Emissions from on-site natural gas-fired boilers, fugitive emissions from the oil storage tanks, emissions from the Marine Vapor Combustion Unit, emissions from the emergency diesel fire water pump engines, and fugitive leaks throughout the facility.
  - *Scope 2:* emissions generated by the production of electricity purchased by the facility.
  - *Scope 3:* At a minimum, all emissions generated with Washington State by the oil trains travelling to and from the Tesoro-Savage Facility, as well as emissions from the oil tanker ships travelling within the state's three mile nautical boundary.
  
- **Earth**
  - *Erosion:* From storage tank construction and operations into the adjacent Parcel 1A wetlands mitigation site, a 7.9 acre "depressional, palustrine forested wetland (PFO)." ASC at 3-313.
  
- **Habitat**
  - *Shoreline and fish habitat:* Impacts to the shoreline from improvements to shipping terminal, and associated impacts on fish habitat and other near-shore riparian habitat.
  - *Parcel 1A Wetlands Mitigation Area:* Erosion, stormwater runoff, emissions and noise impacts on the Parcel 1A wetlands mitigation site, located immediately east of Parcel 1A where the oil storage tank farm will be located, including surveys for waterfowl (including mallard ducks, pintail, wigeon, merganser, gadwalls, green-winged teal, Canada goose, and snow goose), bald eagles, sandhill cranes, great blue herons, as well as reptiles and amphibians that may be present in the wetlands area.
  
- **Water**
  - *On-Site Stormwater Runoff:* From the Port of Vancouver site into the Parcel 1A wetlands area, as well as into the Columbia River.

- *Railroad Stormwater Runoff*: From the railroad line to the Columbia River, and the directly into waterways crossed by the rail line through drips and leaks from oil trains.
- *Oil Spill Impacts*: Risk of catastrophic oil spill along the entire length of the train route, from the oil terminal facility, or during shipping in the Columbia River of the Pacific Ocean, including impacts on aquatic ecology, bird populations, and the economy, including commercial and recreational fishing, the shipping industry, tourism, agriculture, and municipal water supplies.
- **Recreation**
  - *Waterborne Recreation*: Impact of additional large vessel traffic in the Columbia River on waterborne recreation, including recreational fishing.
- **Transportation**
  - *Rail Congestion*: Impacts on other users of Pacific Northwest railroads, including grain and fruit shippers, intermodal users, ports, industries, aircraft manufacturers and passenger rail, given reports indicating that the railroad prioritizes unit trains, such as oil trains, over other shippers.
  - *Vessel Traffic*: Impacts on navigation from additional oil tanker traffic, particularly at the Columbia Bar Crossing and other restrictions to vessel movement.

Tesoro Savage CBR  
Scoping Comment  
#30737

(UTC)

---

**From:** Marla Nelson <msnelson@nedc.org>  
**Sent:** Wednesday, December 18, 2013 3:20 PM  
**To:** EFSEC (UTC)  
**Cc:** JJ England  
**Subject:** Re: NEDC Scoping Comments re Tesoro Savage Proposal  
**Attachments:** Exhibit 10 - CEQ Draft Guidance re GHGs and Climate Change.pdf; Exhibit 6 - Port of LA Emissions inventory.pdf; Exhibit 7 - Caiazzo re Air pollution.pdf; Exhibit 8 - Ravishankara re Nitrous Oxide.pdf; Exhibit 9 - Federal Land Managers Air Quality Work Group.pdf

**Categories:** Red Category

Exhibits 6 - 10 attached.

On Wed, Dec 18, 2013 at 3:19 PM, Marla Nelson <msnelson@nedc.org> wrote:  
Attached please find scoping comments from the Northwest Environmental Defense Center. There are 10 exhibits, which may be attached in later emails per size constraints.

Thank you,  
Marla Nelson

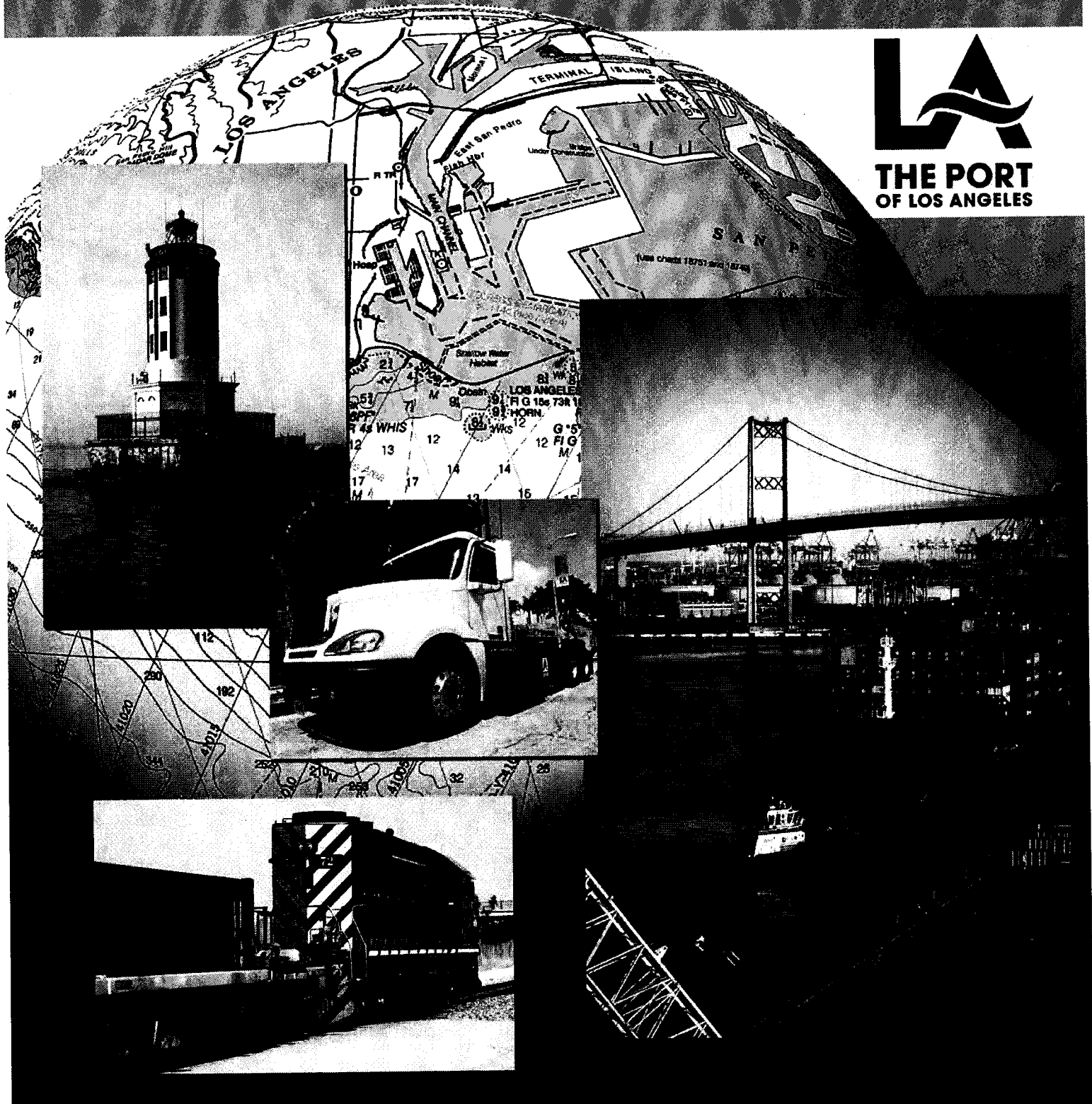
--

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Spokane Clean Water Project  
You can access my papers on SSRN here

--

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You can access my papers on SSRN here

# PORT OF LOS ANGELES INVENTORY OF AIR EMISSIONS - 2011



Technical Report  
ADP#111129-929  
July 2012



Prepared by:  
STARCREST CONSULTING GROUP, LLC



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In addition, the tanker classification was updated in 2011 based on the 2011 San Pedro Bay Ports Tanker Modeling Improvement Project Study. The tanker size classification was improved by replacing Handyboat with Handysize; updating the very large crude carrier (VLCC) and ultra large crude carrier (ULCC) classifications to harmonize with Lloyds and specifically identifying the size measurement in deadweight (DWT) tonnes ranges for the various tanker types. The tanker deadweight classification system changes are summarized in Table 3.18.

**Table 3.18: Tanker Classification Changes**

New Classification		Previous Classification	
Tanker	DWT (tonnes)	Tanker	DWT (tonnes)
Handysize	0 to 49,999	Handyboat	0 to 49,999
Panamax	50,000 to 79,999	Panamax	50,000 to 79,999
Aframax	80,000 to 119,999	Aframax	80,000 to 119,999
Suezmax	120,000 to 199,999	Suezmax	120,000 to 149,999
VLCC	200,000 to 299,999	VLCC	150,000 to 319,999
ULCC	300,000+	ULCC	320,000+

**3.5.14 Future Improvements to Methodology**

For future emission inventories, improvements to the methodology will be considered in the following areas:

- 1) Engine modification technologies will be incorporated in new engines as standard practice and installed as retrofits in existing vessels. The ports will work with engine manufacturers and shipping companies, and through the TWG process, to further refine the emissions benefits associated with slide valves in new engines and in retrofits, as well as other technologies being implemented;
- 2) Update auxiliary engine loads based on VBP;
- 3) At the end of 2011, CARB changed the boundary for the OGV Fuel Regulation and the new boundary will be taken into consideration for the 2012 EI.

**3.6 Emission Estimates**

The following tables present the estimated OGV emissions categorized in different ways, such as by engine type, by operating mode, and by vessel type. In order for the total emissions to be consistently displayed for each pollutant in all the tables, the individual values in each table column do not, in some cases, add up to the listed total in the table. This is because there are fewer decimal places displayed (for readability) than are included in the calculated totals.



*Inventory of Air Emissions CY 2011*

A summary of the ocean-going vessel emission estimates by vessel type for all pollutants for the year 2011 is presented in Tables 3.19 and 3.20. The criteria pollutant emissions are in tons per year (tpy), while the greenhouse gas emissions are in tonnes.

**Table 3.19: 2011 Ocean-Going Vessel Emissions by Vessel Type, tpy**

Vessel Type	PM <sub>10</sub>	PM <sub>2.5</sub>	DPM	NO <sub>x</sub>	SO <sub>x</sub>	CO	HC
Auto Carrier	3.2	2.8	3.0	82.9	22.0	8.3	3.6
Bulk	2.2	1.9	2.0	56.7	16.2	5.6	2.4
Bulk - Heavy Load	0.1	0.1	0.1	3.6	0.9	0.3	0.1
Bulk - Wood Chips	0.0	0.0	0.0	1.0	0.3	0.1	0.0
Container - 1000	1.6	1.5	1.4	49.7	11.4	5.3	2.4
Container - 2000	9.8	8.5	7.4	215.7	91.3	21.8	9.5
Container - 3000	0.4	0.3	0.3	9.7	2.3	1.0	0.5
Container - 4000	23.6	20.8	21.9	575.9	144.0	70.1	35.9
Container - 5000	31.3	27.2	28.5	654.0	193.7	84.5	44.8
Container - 6000	30.6	26.7	27.5	654.1	188.3	89.3	47.5
Container - 7000	0.5	0.4	0.4	7.9	2.6	1.2	0.7
Container - 8000	19.3	16.7	17.7	375.1	125.2	51.1	26.4
Container - 9000	8.1	7.0	7.5	163.2	51.0	19.4	9.7
Cruise	15.3	13.8	15.3	427.5	97.8	37.3	14.6
General Cargo	4.3	3.9	4.0	123.9	28.9	11.1	4.6
Ocean Tugboat (ATB/ITB)	0.9	0.9	0.9	29.9	5.3	2.7	1.2
Miscellaneous	0.0	0.0	0.0	0.3	0.1	0.0	0.0
Reefer	1.2	1.1	1.1	41.8	8.0	3.6	1.5
Tanker - Aframax	0.5	0.5	0.3	10.3	5.2	1.1	0.5
Tanker - Chemical	6.5	5.9	3.7	127.9	70.5	12.7	5.4
Tanker - Handysize	3.5	3.1	1.4	58.6	48.6	5.2	2.2
Tanker - Panamax	10.9	9.4	3.9	151.3	161.1	15.1	6.5
<b>Total</b>	<b>173.8</b>	<b>152.5</b>	<b>148.3</b>	<b>3,821.0</b>	<b>1,274.7</b>	<b>446.8</b>	<b>220.0</b>

DB ID692

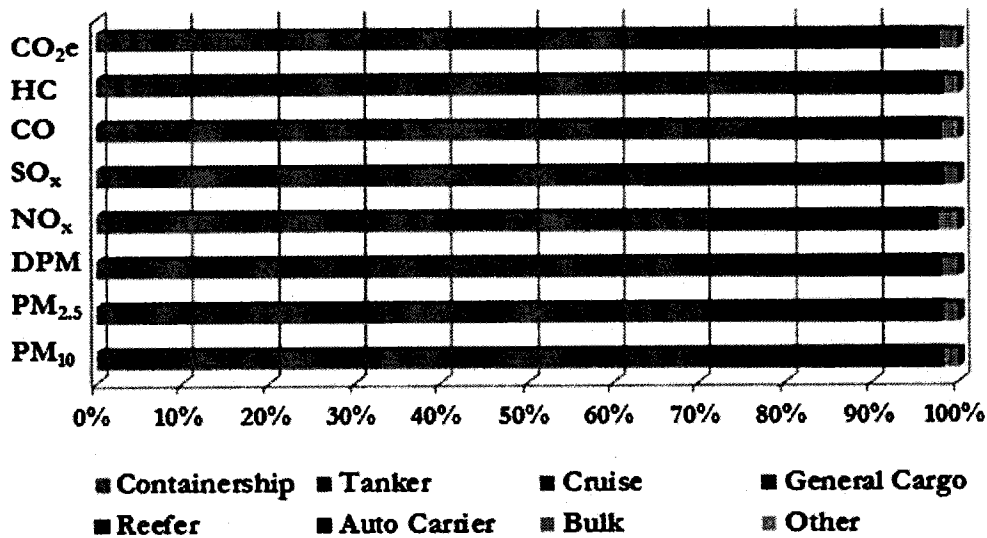
Table 3.20: 2011 Ocean-Going Vessel GHG Emissions by Vessel Type, tonnes

Vessel Type	CO <sub>2</sub> e
Auto Carrier	4,214
Bulk	3,308
Bulk - Heavy Load	230
Bulk - Wood Chips	51
Container - 1000	2,621
Container - 2000	14,368
Container - 3000	519
Container - 4000	28,422
Container - 5000	34,652
Container - 6000	37,178
Container - 7000	418
Container - 8000	20,953
Container - 9000	8,513
Cruise	21,298
General Cargo	6,367
Ocean Tugboat (ATB/ITB)	1,536
Miscellaneous	24
Reefer	2,218
Tanker - Aframax	1,412
Tanker - Chemical	16,521
Tanker - Handysize	7,617
Tanker - Panamax	19,501
<b>Total</b>	<b>231,941</b>

DB ID692

Figure 3.4 shows percentage of emissions by vessel type for each pollutant. Containerships contributed the highest percentage of the emissions (approximately 64 to 80%), followed by tankers (approximately 7 to 22%), cruise ships (approximately 7 to 12%), general cargo, auto carrier, Reefer, and bulk vessels. The “other” category includes ocean-going tugboats and miscellaneous vessels.

Figure 3.4: 2011 Ocean-Going Vessel Emissions by Vessel Type



### 3.6.1 Emission Estimates by Engine Type

Tables 3.21 and 3.22 present summaries of emission estimates by engine type in tons per year.

Table 3.21: 2011 Ocean-Going Vessel Emissions by Engine Type, tpy

Engine Type	PM <sub>10</sub>	PM <sub>2.5</sub>	DPM	NO <sub>x</sub>	SO <sub>x</sub>	CO	HC
Main Engine	87	74	85	1,742	469	263	151
Auxiliary Engine	63	58	63	1,904	403	166	60
Auxiliary Boiler	24	21	0	175	403	18	9
<b>Total</b>	<b>174</b>	<b>153</b>	<b>148</b>	<b>3,821</b>	<b>1,275</b>	<b>447</b>	<b>220</b>

DB ID692

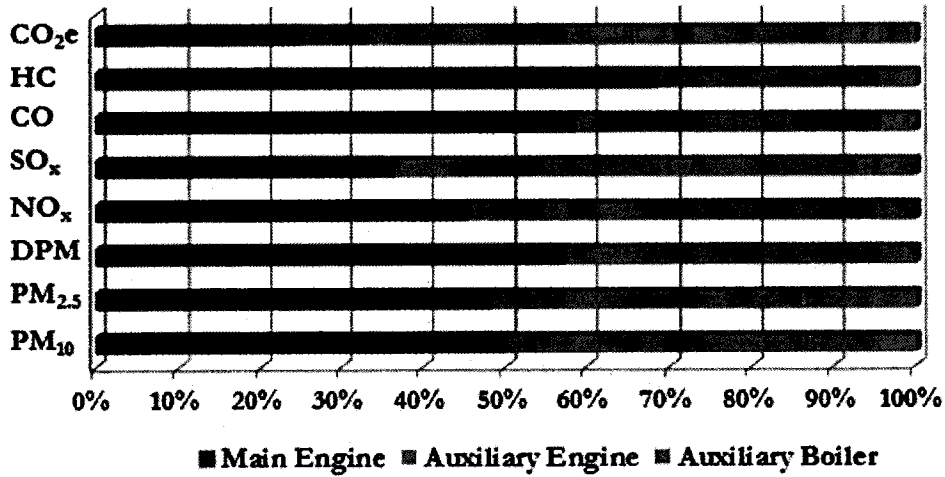
**Table 3.22: 2011 Ocean-Going Vessel GHG Emissions by Engine Type, tonnes**

Engine Type	CO <sub>2</sub> e
Main Engine	58,091
Auxiliary Engine	94,690
Auxiliary Boiler	79,161
<b>Total</b>	<b>231,941</b>

DB ID692

Figure 3.5 shows percentages of emissions by engine type for each pollutant. The majority of OGV emissions are associated with main and auxiliary diesel engines.

**Figure 3.5: 2011 Ocean-Going Vessel Emissions by Engine Type**





**3.6.2 Emission Estimates by Mode**

Tables 3.23 and 3.24 present summaries of emission estimates by the various modes in tons per year. For each mode, the engine type emissions are also listed. Hotelling at terminal berth and at anchorage are listed separately. Transit and harbor maneuvering emissions include both berth and anchorage calls. Figure 3.6 shows results in percentages of emissions by mode.

**Table 3.23: 2011 Ocean-Going Vessel Emissions by Mode, tpy**

Mode	Engine Type	PM <sub>10</sub>	PM <sub>2.5</sub>	DPM	NO <sub>x</sub>	SO <sub>x</sub>	CO	HC
Transit	Main	78.5	66.3	76.7	1,505.0	457.9	215.0	109.9
Transit	Aux	18.0	15.4	18.0	369.7	129.0	31.7	11.5
Transit	Auxiliary Boiler	2.1	1.8	0.0	12.2	38.3	1.2	0.6
<b>Total Transit</b>		<b>98.6</b>	<b>83.5</b>	<b>94.7</b>	<b>1,886.9</b>	<b>625.2</b>	<b>247.9</b>	<b>122.0</b>
Maneuvering	Main	8.4	7.8	8.4	236.9	11.0	48.5	41.1
Maneuvering	Aux	4.4	4.1	4.4	148.9	26.4	13.0	4.7
Maneuvering	Auxiliary Boiler	0.4	0.4	0.0	3.8	6.6	0.4	0.2
<b>Total Maneuvering</b>		<b>13.2</b>	<b>12.3</b>	<b>12.8</b>	<b>389.6</b>	<b>44.0</b>	<b>61.9</b>	<b>46.0</b>
Hotelling - Berth	Main	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hotelling - Berth	Aux	37.7	34.9	37.7	1,271.9	227.0	111.3	40.5
Hotelling - Berth	Auxiliary Boiler	19.6	17.4	0.0	149.6	330.2	15.1	7.5
<b>Total Hotelling - Berth</b>		<b>57.3</b>	<b>52.3</b>	<b>37.7</b>	<b>1,421.5</b>	<b>557.2</b>	<b>126.4</b>	<b>48.0</b>
Hotelling - Anchorage	Main	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hotelling - Anchorage	Aux	3.4	3.1	3.4	113.9	20.5	9.9	3.6
Hotelling - Anchorage	Auxiliary Boiler	1.5	1.3	0.0	9.1	27.8	0.9	0.5
<b>Total Hotelling - Anchorage</b>		<b>4.9</b>	<b>4.4</b>	<b>3.4</b>	<b>123.0</b>	<b>48.3</b>	<b>10.8</b>	<b>4.1</b>
<b>Total</b>		<b>174</b>	<b>153</b>	<b>148</b>	<b>3,821</b>	<b>1,275</b>	<b>447</b>	<b>220</b>

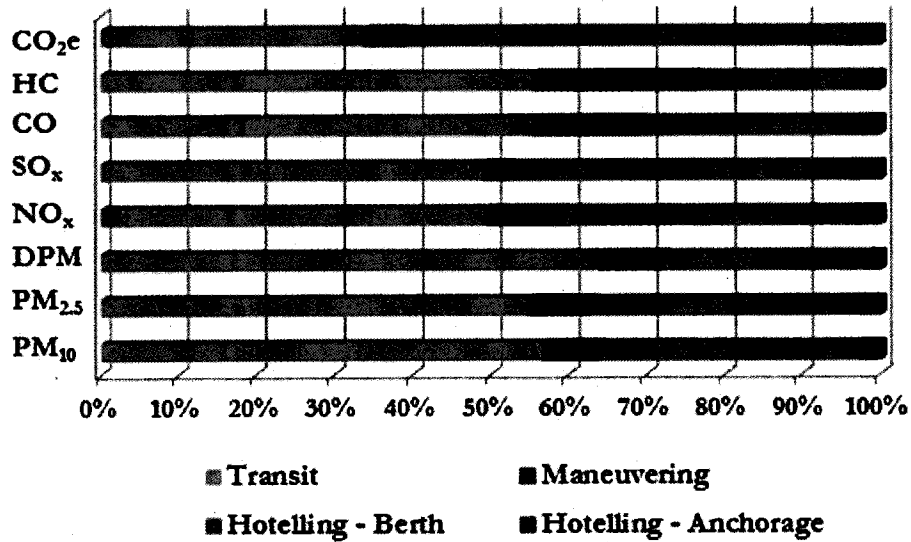
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**Table 3.24: 2011 Ocean-Going Vessel Greenhouse Gas Emissions by Mode, tonnes**

Mode	Engine Type	CO <sub>2</sub> e
Transit	Main	54,716
Transit	Aux	18,111
Transit	Auxiliary Boiler	5,465
<b>Total Transit</b>		<b>78,292</b>
Maneuvering	Main	3,375
Maneuvering	Aux	7,394
Maneuvering	Auxiliary Boiler	1,742
<b>Total Maneuvering</b>		<b>12,511</b>
Hotelling - Berth	Main	0
Hotelling - Berth	Aux	63,519
Hotelling - Berth	Auxiliary Boiler	67,879
<b>Total Hotelling - Berth</b>		<b>131,398</b>
Hotelling - Anchorage	Main	0
Hotelling - Anchorage	Aux	5,666
Hotelling - Anchorage	Auxiliary Boiler	4,074
<b>Total Hotelling - Anchorage</b>		<b>9,740</b>
<b>Total</b>		<b>231,941</b>

DB ID694

Figure 3.6: 2011 Ocean-Going Vessel Emissions by Mode



### 3.7 Facts and Findings

Table 3.25 presents the number of vessel calls and the container cargo throughputs for calendar years 2005 through 2011. The average number of twenty-foot equivalent units (TEUs) per containership call was at its highest for 2010 and 2011 calendar years, which means that, on average, more TEUs were handled per vessel call in 2010 and 2011 than in the previous years.

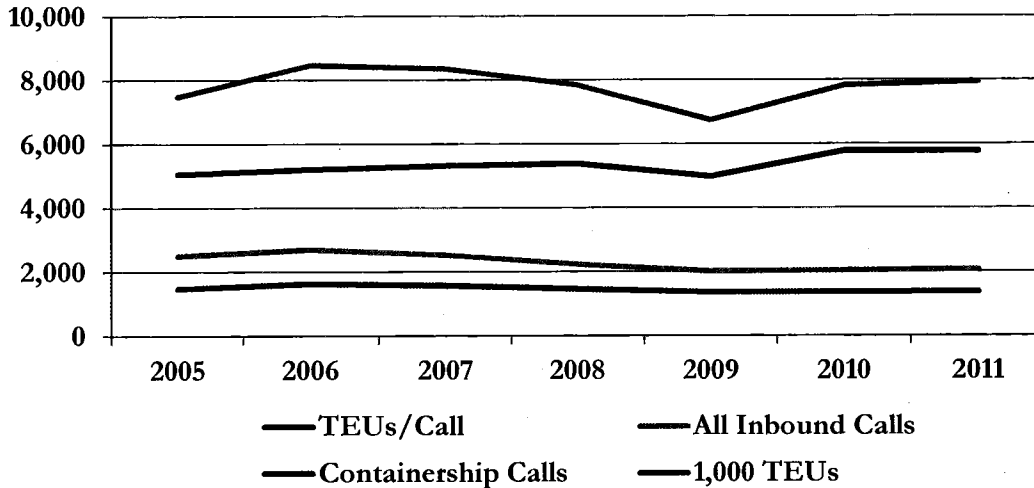
Table 3.25: Container and Cargo Throughputs and Change

Year	All Calls	Containership Calls	Throughput (TEUs)	Average TEUs/Call
2011	2,072	1,376	7,940,511	5,771
2010	2,035	1,355	7,831,902	5,780
2009	2,010	1,355	6,748,995	4,981
2008	2,239	1,459	7,849,985	5,380
2007	2,527	1,573	8,355,038	5,312
2006	2,703	1,627	8,469,853	5,206
2005	2,501	1,481	7,484,625	5,054
Previous Year (2011-2010)	2%	2%	1%	0%
CAAP Progress (2011-2005)	-17%	-7%	6%	14%



Figure 3.7 presents the trends in the total throughput in TEUs, vessel calls and TEUs/call for 2005 to 2011. The TEUs/container call efficiency increased in 2011.

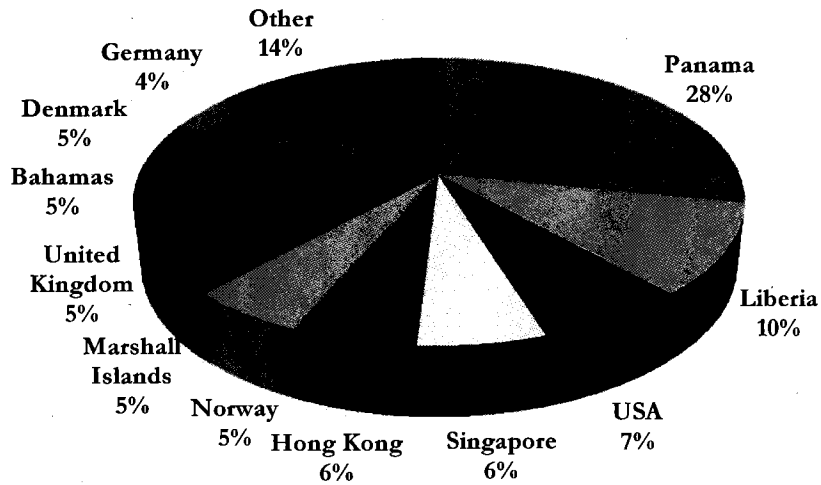
**Figure 3.7: Container and Cargo Throughput Trend**



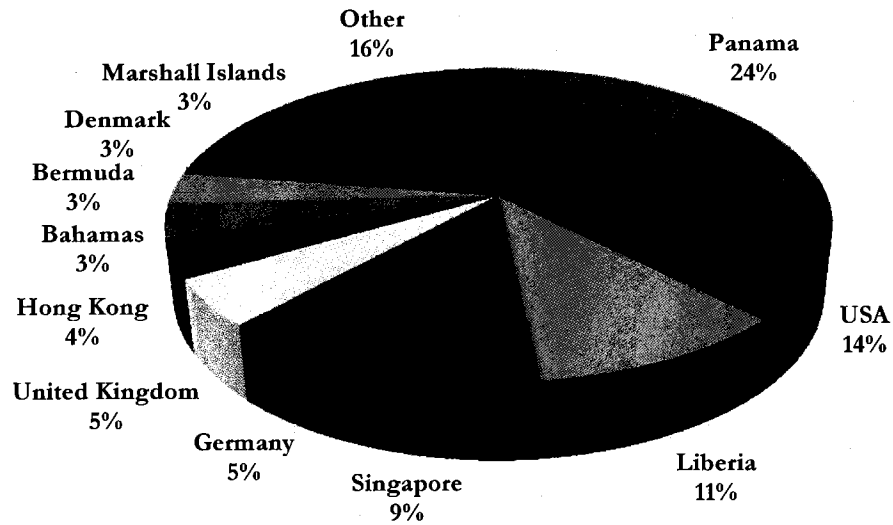
**3.7.1 Flags of Convenience**

Most OGVs are foreign flagged ships, whereas harbor craft are almost exclusively domestic. Approximately 93% of the OGVs that visited the Port were registered outside the U.S. Although only 7% of the individual OGVs are registered in the U.S., they comprised 14% of all calls. This is most likely because the U.S. flagged OGVs make shorter, more frequent stops along the west coast. Figures 3.8 and 3.9 show the breakdown of the ships' registered country (i.e., flag of registry) for discrete vessels and by the number of calls, respectively.

**Figure 3.8: Flag of Registry, Discrete Vessels**



**Figure 3.9: Flag of Registry, Vessel Calls**





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## Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005



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### HIGHLIGHTS

- Ozone and PM impacts of the major combustion sectors in the U.S. are modeled.
- Early deaths attributable to each sector are estimated.
- ~200,000 early deaths occur in the U.S. each year due to U.S. combustion emissions.
- The leading causes are road transportation and power generation.

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### ABSTRACT

Combustion emissions adversely impact air quality and human health. A multiscale air quality model is applied to assess the health impacts of major emissions sectors in United States. Emissions are classified according to six different sources: electric power generation, industry, commercial and residential sources, road transportation, marine transportation and rail transportation. Epidemiological evidence is used to relate long-term population exposure to sector-induced changes in the concentrations of PM<sub>2.5</sub> and ozone to incidences of premature death. Total combustion emissions in the U.S. account for about 200,000 (90% CI: 90,000–362,000) premature deaths per year in the U.S. due to changes in PM<sub>2.5</sub> concentrations, and about 10,000 (90% CI: –1000 to 21,000) deaths due to changes in ozone concentrations. The largest contributors for both pollutant-related mortalities are road transportation, causing ~53,000 (90% CI: 24,000–95,000) PM<sub>2.5</sub>-related deaths and ~5000 (90% CI: –900 to 11,000) ozone-related early deaths per year, and power generation, causing ~52,000 (90% CI: 23,000–94,000) PM<sub>2.5</sub>-related and ~2000 (90% CI: –300 to 4000) ozone-related premature mortalities per year. Industrial emissions contribute to ~41,000 (90% CI: 18,000–74,000) early deaths from PM<sub>2.5</sub> and ~2000 (90% CI: 0–4000) early deaths from ozone. The results are indicative of the extent to which policy measures could be undertaken in order to mitigate the impact of specific emissions from different sectors — in particular black carbon emissions from road transportation and sulfur dioxide emissions from power generation.

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### 1. Introduction

Air pollution adversely affects human health (U.S. EPA, 2011a; WHO, 2006; COMEAP, 2010). The emission of pollutants into the atmosphere is an inherent by-product of combustion processes. Recent research has found that ambient concentrations of fine particulate matter (smaller than 2.5 μm in aerodynamic diameter, PM<sub>2.5</sub>) (Dockery et al., 1993; Pope et al., 2002; WHO, 2006) and ozone (Bell et al., 2004; Jerrett et al., 2009; WHO, 2008a) are

associated with the incidence of premature mortality and morbidity outcomes. Although other anthropogenic air pollutants are recognized as causes of adverse health impacts, ground level PM<sub>2.5</sub> and ozone exposure is currently considered the most significant known cause of early deaths related to poor outdoor air quality (U.S. EPA, 2011a). The U.S. Environmental Protection Agency estimated that in 2010 there were ~160,000 premature deaths in the U.S. due to PM<sub>2.5</sub> exposure and ~4300 deaths related to ozone exposure. Fann et al. (2012) estimated between 130,000 and 340,000 PM<sub>2.5</sub>-related early deaths in 2005, and between 4700 and 19,000 ozone-related early deaths.

In the U.S., air pollution is regulated by the Clean Air Act and its amendments (1970 through 1990), which enables the EPA to set

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national air quality standards for six criteria air pollutants including PM<sub>2.5</sub> and ozone (U.S. EPA, 2011a). The Environmental Protection Agency estimated that in 2012 about 74 million people in the U.S. are exposed to levels of PM<sub>2.5</sub> higher than the limit standard and that more than 131 million live in regions not compliant with maximum allowable ozone levels (U.S. EPA, 2012b). The EPA computed the costs for the implementation of the 1990 Clean Air Act to be about 65 billion dollars, with a potential benefit reaching 2 trillion dollars from 1990 to 2020, potentially avoiding ~230,000 premature deaths in 2020 (U.S. EPA, 2011a). Although the CAA90 policy-implementation costs are distributed among different source categories, the attribution of air quality-related premature mortalities to different sectors has not been quantified in the peer-reviewed literature. An assessment of the early deaths attributable to different sources would create the potential to drive specific policies with the aim of maximizing the health benefits related to emission reductions from a certain economic activity. In the U.S., anthropogenic combustion emissions represent the predominant source of ground level PM<sub>2.5</sub> and ozone concentrations (U.S. EPA, 2011a).

In the first part of the present study we evaluate premature deaths attributable to U.S. combustion emissions represented by the following sectors: electric power generation, industry, commercial/residential activities, road transport, marine transport and rail transport. The contribution of PM<sub>2.5</sub> and ozone-related mortalities is quantified to inform policy makers about opportunities to diversify regulations by taking into account the health impact caused by different types of human activities. The second part of the study (Part II) will focus on assessing future-year combustion emissions impacts from different sectors and on future possible mitigation strategies.

## 2. Data and methodology

The health impacts of combustion emissions from different sectors are evaluated through the derivation of a temporally, spatially and chemically resolved emissions inventory in the contiguous United States (CONUS), and parts of Canada and Mexico for the reference year 2005. Meteorology and air quality models are used to relate emissions to pollutant concentrations. A baseline simulation, including all emission sources, is performed to assess the model capability to predict meteorological fields, particulate matter and ozone concentrations. Sector emission scenarios are developed wherein combustion emissions from each of the six emission sectors defined above are removed in turn from the baseline inventory; differences in particulate matter and ozone concentrations between the baseline and sector scenario simulations are attributed to the contribution of that specific sector. Population exposure to sector-attributable PM<sub>2.5</sub> and ozone concentrations are used with concentration-response functions (CRFs) to estimate premature mortality impacts of each sector.

The calculated mortalities can be seen as potentially avoidable deaths in the reference year 2005 related to the instantaneous removal of combustion emissions from each specific sector. An extensive discussion about the use of number of premature deaths per year as a metric for anthropogenic health impact assessments is given by the UK Committee on the Medical Effects of Air Pollutants (COMEAP, 2010). The approach adopted in this study follows the methodology for the evaluation of “current” health burdens from air pollution described by COMEAP (2010). The remainder of this section details each of the steps previously described.

### 2.1. Meteorological modeling

The modeling domain is centered about the CONUS, including parts of Canada and Mexico. The horizontal resolution is 36 km (112

rows by 148 columns), with 34 sigma-pressure vertical layers. Meteorological fields for the year 2005 are derived using the Weather Research and Forecasting Model (WRF version 3.3.1; Skamarock et al., 2008), driven by four-dimensional data assimilation from the six-hourly NCEP Final Analyses (FNL) data at 1° × 1° resolution. Meteorological simulations are validated against direct hourly temperature and wind observations from 1672 and 1619 stations, respectively. Observations are collected by the Meteorological Assimilation Data Ingest System (MADIS, 2010), developed by the National Oceanic and Atmospheric Administration (NOAA).

### 2.2. Emissions

Baseline emissions in the U.S., Canada and Mexico are derived from the 2005 EPA National Emissions Inventory (NEI; U.S. EPA, 2008a). This represents the most up to date emissions inventory at the time of this study. NEI 2005 emissions are compiled using data from numerous state and local agencies. The Sparse Matrix Operator Kernel Emissions program version 2.6 (SMOKE, 2010) is used to prepare emissions for the air quality model. SMOKE applies chemical speciation profiles (in case of PM, NO<sub>x</sub> and Volatile Organic Compounds), temporal profiles and spatial surrogates for allocation of emissions into model grid-cells. The spatial surrogates are compiled by the EPA (SMOKE, 2010) to allocate area and line sources (which are often specified as county totals) to the CMAQ model grid cells. The emissions are distributed using area-weighting, and the emission allocation is done based on source classification codes (SCCs).

Pre-processed WRF meteorological fields are used to treat emissions from mobile sources for which emissions factors are significantly influenced by local temperature and relative humidity (Ashok, 2011) as well as to compute the plume rise of point-source emission sources and vertically allocate them into the model layers. Emissions scenarios are developed for six source categories (“sectors”): (a) electric power generation, (b) industry, (c) commercial/residential, (d) road transportation, (e) marine transportation, (f) rail transportation. Sectors are defined with differences relative to EPA source categories (U.S. EPA, 2008b) including that commercial and residential sources are merged together and transportation is divided into three separate sectors (discussed later). The division of the transportation sector is performed in order to capture contributions from different modes of transportation and assess modal emission mitigation strategies in future years in the second part of the study.

Sector emissions are taken out from each scenario by removing, in turn, the sources associated to the specific sector from the baseline NEI dataset. Aviation emissions are included in the baseline case, but aviation is not explicitly considered as a sector here since the premature mortalities related to this specific sector have been assessed in Yim et al. (2013). Sector-attributable emissions are considered only in the CONUS together with the U.S. maritime exclusive economic zone (200 nmi off the coastline, plus maritime boundaries with adjacent/opposite countries). Emissions from Canada and Mexico are kept in all the simulations at their original baseline values. We thus focus our investigation on the health impacts on U.S. population from sources located within the U.S. territory. The CONUS and maritime boundary specifications are taken from the National Atlas of the United States of America (2012) and from the Office of Coast Survey (OCS) of the NOAA (1998).

Totals for primary particulate matter, NO<sub>x</sub> and SO<sub>2</sub> emissions for the reference year 2005 from each of the sectors are given in Table 1. Combustion emissions from the sectors considered account for 82% of the NO<sub>x</sub> anthropogenic emissions in the continental U.S., and 98% of the sulfur dioxide emissions. Emissions from fugitive dust, agricultural activities, aviation and other non-combustion sources are not considered in the sector specifications.

**Table 1**

PM<sub>2.5</sub> (primary), NO<sub>x</sub> and SO<sub>2</sub> emissions totals and percentages with respect to the baseline scenario (NEI, 2005 dataset, including all sources). Emissions are expressed in Tg year<sup>-1</sup> for each sector considered in the study (data for 2005).

Sector	PM <sub>2.5</sub>		NO <sub>x</sub>		SO <sub>x</sub>	
	Total	%	Total	%	Total	%
Electric power generation	0.46	11.7%	3.42	16.1%	9.46	70.4%
Industry	0.57	14.5%	2.75	13.0%	2.55	19.0%
Commercial/residential	0.69	17.6%	0.76	3.6%	0.49	3.6%
Road transportation	0.27	6.9%	8.17	38.5%	0.16	1.2%
Marine transportation	0.07	1.8%	1.30	6.1%	0.45	3.4%
Rail transportation	0.03	0.8%	1.01	4.8%	0.07	0.5%
Other	1.84	46.8%	3.81	18.0%	0.25	1.9%
Total	3.93	100.0%	21.22	100.0%	13.43	100.0%

It is possible to relate the totals found from the 2005 NEI to more recent estimates by using yearly total emissions trends for air pollutants in the U.S. (U.S. EPA, 2012a). The trends estimated by EPA indicate that with respect to 2005, in 2012 SO<sub>2</sub> emissions would be ~60% lower, NO<sub>x</sub> emissions ~40% lower, and VOC emissions ~15% lower, while PM<sub>2.5</sub> and ammonia emissions are expected to increase by ~14% and ~5% respectively. We note that these figures are preliminary estimates and, particularly for SO<sub>2</sub> and NO<sub>x</sub>, may be significantly revised.

### 2.3. Air quality modeling

Air quality simulations for the year 2005 are performed using the CMAQ (version 4.7.1) regional chemistry-transport model (Byun and Schere, 2006) at a spatial resolution of 36 km × 36 km. A two-week spin-up time is used to mitigate the influence of initial conditions. The initial and boundary conditions for the CMAQ simulations are provided by Barrett et al. (2012). Simulated PM<sub>2.5</sub> baseline concentrations are validated against 24-h averaged observations from 543 stations collected by the EPA Speciation Trends Network (STN). Ozone baseline concentrations are validated against hourly data from 538 stations from the U.S. EPA Air Quality System (AQS) (U.S. EPA, 2011b).

### 2.4. Health impacts

Epidemiological studies have quantified the relationship between adverse health effects and long-term exposure to PM<sub>2.5</sub> (U.S. EPA, 2011a; Lewtas, 2007; Krewski et al., 2009; Laden et al., 2006) and ozone (Bell et al., 2004; Jerrett et al., 2009). The quantitative association between premature mortality and ground-level concentrations of PM<sub>2.5</sub> and ozone is generally assessed through the derivation of relative risk (RR) factors and concentration-response functions (CRFs). An expert elicitation by the U.S. EPA reports a decrease of 1% (range 0.4%–1.8%) in annual all-cause deaths for a 1 μg m<sup>-3</sup> decrease in the annual average PM<sub>2.5</sub> exposure in the United States (U.S. EPA, 2011a). Similar results are reported for Europe (Cooke et al., 2007). Jerrett et al. (2009) associated long-term ozone exposure with the risk of death from respiratory causes. In that study, the relative risk of early death from respiratory diseases as a consequence of an increase in ozone concentration of 10 ppb is estimated as 1.040 (95% confidence interval, 1.010–1.067).

PM<sub>2.5</sub> and ozone account for the majority of monetary losses related to the health impacts of air pollution (Ratliff et al., 2009), and as such long-term exposure to PM<sub>2.5</sub> and ozone form the focus of the present study. Premature deaths in the U.S. related to sector-attributable PM<sub>2.5</sub> are estimated using a linear CRF based on EPA assessments (U.S. EPA, 2011a) and described further in Barrett et al. (2012). The CRF associates long-term exposure to PM<sub>2.5</sub> with

premature deaths from cardiopulmonary causes and lung cancer. For long-term exposure to ozone, a log-linear CRF derived from the results of Jerrett et al. (2009) is adopted, consistent with previous ozone health impact assessments in the U.S. (U.S. EPA, 2011a; Fann et al., 2012). The CRF evaluates the number of premature deaths Δy corresponding to a change in ozone concentration ΔO<sub>3</sub> (Abt Associates Inc. and U.S. EPA, 2012). Specifically,

$$\Delta y = y_0 \cdot \left( 1 - \frac{1}{\exp(\beta \cdot \Delta O_3)} \right) \quad (1)$$

where  $y_0$  is the baseline incidence rate of the health effect (death from respiratory diseases). The change in ozone concentration ΔO<sub>3</sub>, specified in ppb, represents a change in the daily maximum ozone concentration averaged during the ozone season (April 1 – September 30), as described in Jerrett et al. (2009). The coefficient β takes on specific values for urban areas as well as region-specific values for rural areas based on the following geographical regions of the U.S.: Northeast, Industrial Midwest, Southeast, Upper Midwest, Northwest, Southwest, Southern California, as defined by the EPA (Krewski et al., 2000). Nominal values of β and standard error estimates used for uncertainty quantification are provided by the EPA (Abt Associates Inc. and U.S. EPA, 2012). For both PM<sub>2.5</sub> and ozone, mortalities are evaluated as single sector contributions for adults over 30 years old. Baseline incidences for pollutant-related mortalities (cardiopulmonary diseases and lung cancer for the PM<sub>2.5</sub> CRF, respiratory diseases for the ozone CRF) are taken from the WHO Global Burden of Disease (WHO, 2008b). Population density is retrieved from the Gridded Population of the World database (GPWv3, 2004).

### 2.5. Uncertainty assessment

The uncertainties inherent in the premature mortality calculations, including uncertainties from the CRF parameters as well as the air quality modeling, are quantified in this study. For PM<sub>2.5</sub> related mortality calculations, the uncertainty in the CRF is accounted for with a triangular probability distribution of multiplicative factors with (low, nominal, high) values of (0.3, 1, 1.7) (U.S. EPA, 2006). The low, nominal and high values correspond to the vertices of the triangular distribution function. The distribution of CMAQ model normalized mean biases is used to account for the uncertainty in predicting PM concentrations, and it is modeled as a normal distribution of mean 7.55% and standard deviation of 28.1%. The minimum (–67.2%) and maximum (108.1%) normalized mean biases are adopted as limiting values to trim the tails of the normal distribution. The reciprocal of the biases distribution are used as multiplicative factors to correct CMAQ model predictions in the uncertainty calculations.

We note that the uncertainty related to different toxicities among PM<sub>2.5</sub> species as well as a ~10% probability of no causal link between PM<sub>2.5</sub> exposure and premature mortality (Roman et al., 2008) have not been accounted for quantitatively in this study. The assumption of equal toxicities is consistent with U.S. EPA expert elicitation studies (U.S. EPA, 2004), but represents an unquantified uncertainty (Levy et al., 2009). A similar approach is applied for the uncertainty assessment of ozone-related premature mortalities. For the ozone CRF shown in Equation (1) we consider a triangular probability distribution of multipliers with (low, nominal, high) values of (β – 1.96 σ<sub>β</sub>, β, β + 1.96 σ<sub>β</sub>), as tabulated in Abt Associates Inc. and U.S. EPA, 2012. The values σ<sub>β</sub> of correspond to the standard errors for the health impact estimates performed by the CRF in different regions of the U.S. (Abt Associates Inc. and U.S. EPA, 2012). The β coefficients and their corresponding standard errors vary between each of the seven geographical regions of the U.S.

**Table 2**  
Statistical model evaluation of WRF (wind speed and temperature) and CMAQ (PM<sub>2.5</sub> and ozone) against observations. Wind speed and temperature are evaluated on an hourly basis, PM<sub>2.5</sub> on a 24-h average, and ozone is evaluated as daily maximum values recorded during the ozone season (Apr–Sept). The units for each quantity are indicated in the table.

	Wind [m s <sup>-1</sup> ]	T [°C]	PM <sub>2.5</sub> [μg m <sup>-3</sup> ]	Ozone [ppb]
Model Mean	3.58	12.93	13.85	55.01
Model SD	2.14	11.76	9.39	15.74
Observed Mean	3.32	12.88	12.98	56.74
Observed SD	2.46	11.89	8.49	17.88
Index of Agreement	0.82	0.98	0.69	0.74
Correlation	0.68	0.97	0.49	0.57
Annual Mean Bias (%)	8.02	0.39	6.77	-3.04
Root-mean-square error	1.88	2.90	9.13	15.87
Mean Bias	0.22	0.05	0.88	-1.72
Mean Normalized Bias (%)	10.17	1.25	28.60	2.62
Normalized Mean Bias (%)	8.02	0.39	6.77	-3.04
Mean Fractional Bias (%)	30.24	10.42	1.90	-1.96
Mean Error	1.45	2.17	6.53	11.62
Normalized Mean Gross Error (%)	43.67	16.86	50.33	20.47
Mean Normalized Gross Error (%)	42.47	12.02	63.01	22.37
Mean Fractional Error (%)	65.47	-8.92	49.46	21.10
Data Availability (%)	74.74	76.94	73.73	98.12

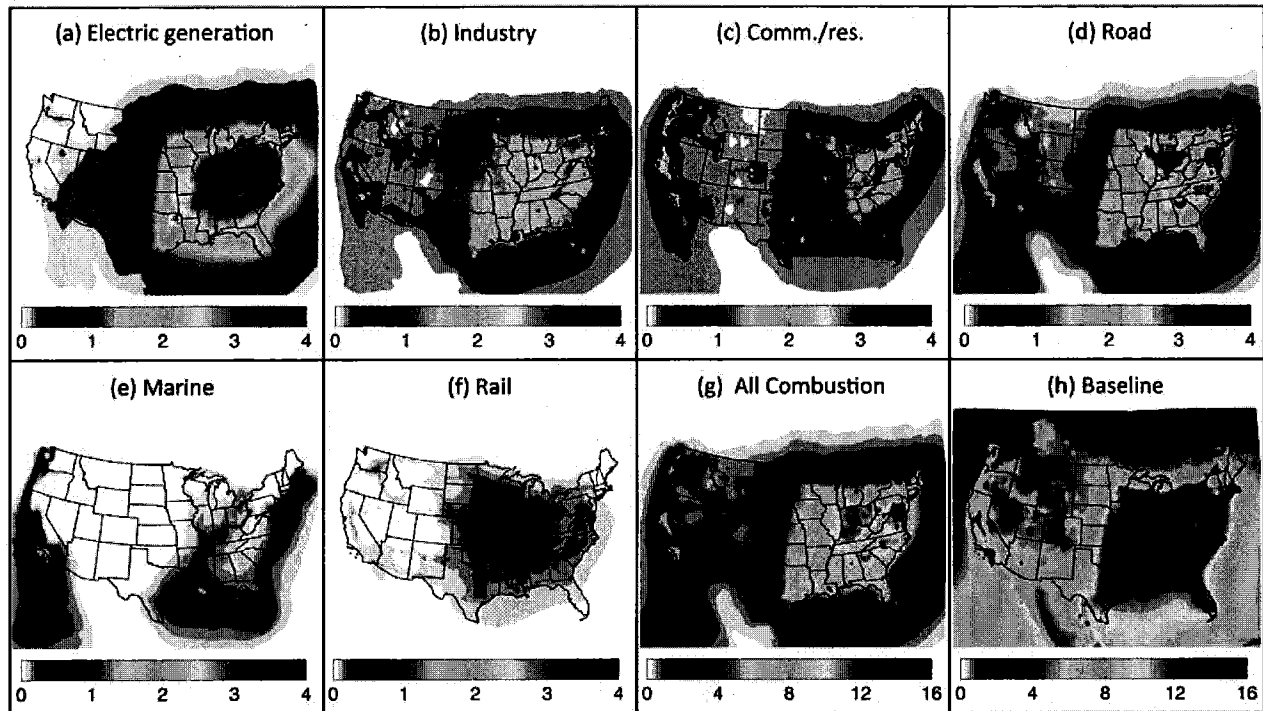
described in Section 2.4. As such, the ozone CRF uncertainty bounds are computed individually for each of the regions. Region-specific uncertainty for the CMAQ ozone predictions is calculated using a normal distribution of normalized mean biases. Mean value, standard deviation and limits of the distributions are computed for each region following the same approach as for the PM<sub>2.5</sub>-related model uncertainty evaluation.

### 3. Results

#### 3.1. Model evaluation

Meteorological and air quality simulations are validated against observations using a set of statistical metrics recommended by the EPA (U.S. EPA, 2005). The definitions for each of the metrics can be found in Yim and Barrett (2012): in particular, an index of agreement (IA) of 1 indicates perfect agreement between the model and the available observations.

Overall the simulated meteorology and air quality statistics, shown in Table 2, are within the range or close to recent studies adopted for similar applications (Yim and Barrett, 2012; Gilliam and Pleim, 2010). Simulated wind speed (measured in m s<sup>-1</sup>) exhibits an index of agreement of 0.82 and a normalized mean bias around 8% with respect to the available observations. Modeled temperature (measured in °C) shows an IA of 0.98 and a positive bias of 0.39%. The 24-h averaged fine particulate matter (in μg m<sup>-3</sup>) computed by CMAQ has an index of agreement of 0.69. For ozone, daily maximum values (in ppb) during the ozone season (Apr–Sept) are computed, showing an index of agreement of 0.74. The model estimates the concentrations of PM<sub>2.5</sub> and ozone with a normalized mean bias of 6.77% and -3.04% respectively. The daily maximum evaluation of ozone during the ozone season yields a normalized mean gross error of 20.47%. Considering all the monitoring stations, the highest bias for the ozone seasonal daily maximum is 61%, the minimum is -42%. These values, computed in each of the seven U.S. regions that characterize the discrete application of the ozone CRF (1), are used as limits for the model uncertainty computations. The annual mean PM<sub>2.5</sub> modeling bias for all stations exhibits a maximum value of 108% and a minimum of -67%: as noted in



**Fig. 1.** Annual average ground-level PM<sub>2.5</sub> concentration (μg m<sup>-3</sup>) from U.S. sources attributable to combustion emissions from (a) electric power generation; (b) industry; (c) commercial and residential sources; (d) road transportation; (e) marine transportation; (f) rail transportation; (g) sum of all combustion sources; (h) all sources (baseline case for this study). A different scale is adopted for (a–f) and (g–h).

**Table 3**

Population-weighted concentrations of PM<sub>2.5</sub> ( $\mu\text{g m}^{-3}$ ) and ozone (ppb) attributable to combustion emissions from the six sectors considered in this study. PM<sub>2.5</sub> population-weighted annual mean concentration is speciated into six categories: sulfate (Sulf), nitrate (Nit), ammonium (Amm), black carbon (BC), organics (Org) and unspiciated (Uns). The total concentration of PM<sub>2.5</sub> is displayed in the second last column of the table. The PM concentrations are annually averaged while the ozone concentration is evaluated as daily maximum averaged over the ozone season (Apr–Sept).

Sector	PM <sub>2.5</sub>						Total PM <sub>2.5</sub>	Ozone
	Sulf	Nit	Amm	BC	Org	Uns		
Electric power generation	1.13	0.05	0.36	0.01	0.48	0.24	2.27	2.15
Industry	0.41	0.19	0.19	0.04	0.42	0.52	1.78	2.06
Commercial/residential	0.13	0.12	0.08	0.08	0.93	0.47	1.82	0.67
Road transportation	0.10	0.61	0.25	0.27	0.98	0.08	2.30	6.90
Marine transportation	0.11	0.03	0.04	0.06	0.09	0.03	0.36	0.39
Rail transportation	0.01	0.05	0.02	0.03	0.09	0.00	0.20	0.53
Total from combustion	1.89	1.05	0.94	0.49	2.99	1.34	8.73	12.70

section 2.4, these values are used as uncertainty ranges in the CMAQ PM<sub>2.5</sub> evaluation.

### 3.2. PM<sub>2.5</sub> impacts

Annual average ground-level PM<sub>2.5</sub> attributable to U.S. emissions from the different sectors considered in this study is shown in Fig. 1. The general distribution of particulate matter concentrations highlights the clustering of anthropogenic activities along the coastlines and in the Midwest regions of the U.S.

Table 3 shows the population-weighted annual mean concentrations of PM<sub>2.5</sub> (together with its composite species) and ozone attributable to the different sectors. Road transportation is responsible for a PM<sub>2.5</sub> population-weighted concentration of  $2.30 \mu\text{g m}^{-3}$  in U.S., representing the largest contributor to PM-related impacts. Most of the particulate matter attributable to road transport emissions is organic ( $0.98 \mu\text{g m}^{-3}$ ) followed by nitrate aerosol ( $0.61 \mu\text{g m}^{-3}$ ); this reflects the fact that onroad mobile emissions are the largest source of NO<sub>x</sub> in the U.S., as shown in Table 1. Vehicle emissions are also the largest contribution to population-weighted black carbon concentrations ( $0.27 \mu\text{g m}^{-3}$ ). The change in black carbon concentration attributable to road vehicles in the U.S. is shown in Fig. 2a. BC concentrations peak in major cities where the traffic is higher, in contrast to total PM<sub>2.5</sub> concentrations (Fig. 1d) which are more diffuse due to the inclusion of secondary particulate matter. For this reason, black carbon from road emissions has a relatively high adverse health impact with respect to other PM species.

Electric power generation is responsible for a population-weighted annual mean PM<sub>2.5</sub> concentration of  $2.27 \mu\text{g m}^{-3}$ . Given

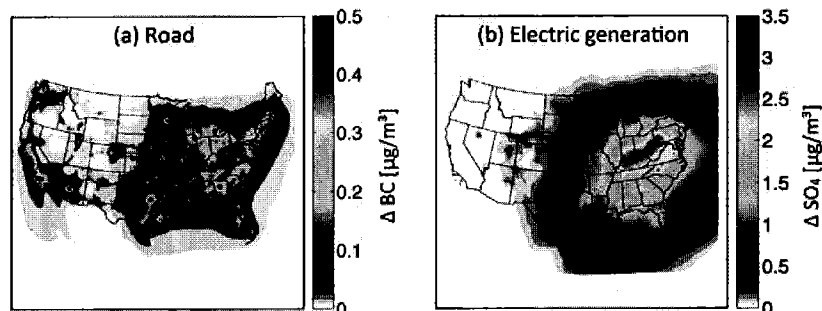


Fig. 2. Annual average ground-level concentration (in  $\mu\text{g m}^{-3}$ ) in the U.S. of (a) black carbon (BC) due to road transportation; (b) SO<sub>4</sub> due to electric power generation.

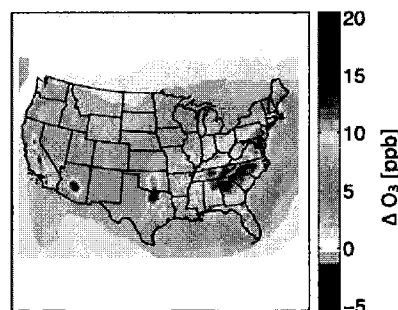


Fig. 3. Variation of mean (Apr–Sept) daily maximum ozone concentration (ppb) due to road transportation emissions in 2005.

the discrete distribution of power plants, the contribution of this sector is less ubiquitous with respect to road transportation (Fig. 1a), being less relevant on the western regions. Power plants account for 16% of NO<sub>x</sub> emissions and 70% of SO<sub>2</sub> emissions in the U.S. (Table 1). Of the 9.46 million tons of sulfur dioxide emitted in 2005, about 95% comes from coal-fired power plants (NRDC, 2007) which represent the largest source of electricity in the U.S. (U.S. EIA, 2012).

Eastern power plants generally use coal with higher sulfur content than western power plants (U.S. EIA, 2002). This trend is shown in Fig. 2b, which displays the ground-level annual mean sulfate concentration attributable to electric generation. In the Midwest states, the sulfate concentration exhibits peaks of  $3.5 \mu\text{g m}^{-3}$ , which account for the  $1.13 \mu\text{g m}^{-3}$  population-weighted concentration of sulfate due to the electric sector. Yim and Barrett (2012) reported a population-weighted mean annual sulfate concentration of about  $0.25 \mu\text{g m}^{-3}$  in the UK, showing a significantly smaller impact of the electric generation sector in this country with respect to what we found in the U.S. This is partially due to the fact that the largest power plants in the UK are generally located relatively far away as well as downwind from highly populated regions.

Combustion emissions from commercial and residential sources generate a mean annual population-weighted PM<sub>2.5</sub> concentration of  $1.82 \mu\text{g m}^{-3}$ , mostly composed of organic particulate matter ( $0.93 \mu\text{g m}^{-3}$ ). Due to the nature of these sources, the peaks in commercial/residential contributions occur in the most densely populated areas of the east and the west coast (Fig. 1c).

Fig. 1b shows mean PM<sub>2.5</sub> concentrations due to emissions from industrial activities, which account for a population-weighted annual concentration of  $1.78 \mu\text{g m}^{-3}$ . The concentration distribution exhibits peaks in the Midwest industrial area between Chicago and Detroit, and in the regions around Philadelphia, Atlanta and Los Angeles. The largest contributions occur in the coastline of the U.S. Gulf Coast connecting Mobile (AL), New Orleans (LA) and Houston (TX). The high concentration of industry-attributable PM<sub>2.5</sub> in this

**Table 4**  
Premature deaths [90% confidence interval] in the U.S. in 2005 due to long-term exposure to PM<sub>2.5</sub> and ozone associated to combustion emissions from different sectors.

Sector	PM <sub>2.5</sub>	O <sub>3</sub>
Electric power generation	52,200 [23,400–94,300]	1700 [–250–3700]
Industry	40,800 [18,300–73,700]	1750 [–30–3500]
Commercial/residential	41,800 [18,700–75,500]	350 [–50–750]
Road transportation	52,800 [23,600–95,300]	5250 [–850–11,100]
Marine transportation	8300 [3700–15,000]	530 [–50–1100]
Rail transportation	4500 [2000–8100]	540 [–100–1200]
Aviation	1200 [550–2600]	155 [71–260]
(Yim et al., 2013) <sup>a</sup>		
Total from combustion <sup>b</sup>	200,400 [89,700–361,900]	10,100 [–1300–21,400]

<sup>a</sup> Refers to global full flight emission impact in the U.S., using the same CRFs described in Section 2.4.

<sup>b</sup> Excluding aviation.

region is related to the presence of the largest oil refineries in the United States (U.S. EIA, 2004).

Mean annual concentrations of particulate matter due to marine emissions are shown in Fig. 1e. Emission sources are considered only within the maritime exclusive economic zone (200 nmi off the coastline, plus maritime boundaries with adjacent/opposite countries), and Southern California exhibits their largest impact in terms of PM<sub>2.5</sub> concentration. Particulate matter forming in this region as a consequence of maritime emissions is then substantially advected to the southeast. Locally significant marine transportation-attributable PM<sub>2.5</sub> concentrations span along all the U.S. coastlines and along the navigable portions of the Mississippi and Ohio rivers. The population-weighted annual average concentration of total PM<sub>2.5</sub> is 0.38  $\mu\text{g m}^{-3}$ , and is almost equally distributed between different PM species.

Finally, Fig. 1f shows the PM<sub>2.5</sub> concentration due to rail emissions: rail-attributable particulate matter spreads relatively

**Table 5**  
Number of premature mortalities (NM) and mortality rate (MR) per year due to PM<sub>2.5</sub> concentrations attributable to different sectors in the 48 states of the CONUS (plus District of Columbia). Mortality rate (MR) corresponds to number of deaths per year per 100,000 people within the state.

State	Electric gen		Industry		Comm/Res		Road		Marine		Rail	
	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR
Alabama	1242	27.3	833	18.3	509	11.2	766	16.8	86	1.9	83	1.8
Arizona	127	2.5	269	5.3	386	7.6	616	12.1	41	0.8	37	0.7
Arkansas	630	23.7	410	15.4	219	8.2	411	15.4	56	2.1	72	2.7
California	468	1.3	4834	13.9	6459	18.6	5726	16.4	3484	10.0	280	0.8
Colorado	177	4.1	160	3.7	388	9.0	264	6.2	5	0.1	24	0.6
Connecticut	473	13.9	332	9.7	821	24.1	697	20.5	62	1.8	25	0.7
Delaware	248	31.4	162	20.5	179	22.7	230	29.2	35	4.4	12	1.6
DC	187	35.1	76	14.2	164	30.8	150	28.2	7	1.3	8	1.5
Florida	2402	15.1	1372	8.6	1045	6.6	1852	11.7	459	2.9	106	0.7
Georgia	2335	28.3	1232	15.0	1161	14.1	1809	22.0	103	1.2	141	1.7
Idaho	13	1.0	127	9.6	112	8.5	68	5.1	4	0.3	10	0.8
Illinois	3161	25.0	2840	22.5	1551	12.3	3135	24.8	176	1.4	437	3.5
Indiana	2032	32.8	1661	26.8	838	13.5	1639	26.5	100	1.6	209	3.4
Iowa	528	17.7	379	12.7	235	7.9	476	16.0	22	0.7	101	3.4
Kansas	448	16.2	365	13.2	211	7.6	396	14.3	15	0.5	99	3.6
Kentucky	1642	39.7	726	17.6	556	13.5	886	21.4	86	2.1	101	2.4
Louisiana	826	18.2	1133	24.9	319	7.0	568	12.5	314	6.9	74	1.6
Maine	98	7.5	81	6.2	192	14.7	105	8.1	14	1.1	3	0.3
Maryland	1885	34.9	987	18.3	1505	27.9	1558	28.8	104	1.9	96	1.8
Massachusetts	821	12.8	1211	18.8	1775	27.6	1368	21.3	131	2.0	42	0.7
Michigan	2289	22.3	1858	18.1	1050	10.2	2484	24.2	103	1.0	196	1.9
Minnesota	580	11.6	664	13.3	559	11.2	777	15.6	38	0.8	122	2.4
Mississippi	684	23.7	431	14.9	241	8.3	414	14.3	82	2.8	56	1.9
Missouri	1329	23.3	873	15.3	588	10.3	1048	18.4	82	1.4	196	3.4
Montana	8	0.8	24	2.7	26	2.8	18	1.9	1	0.1	4	0.5
Nebraska	227	13.1	168	9.7	92	5.3	193	11.1	6	0.3	57	3.3
Nevada	47	2.4	109	5.6	98	5.0	104	5.3	16	0.8	10	0.5
New Hampshire	137	10.9	176	14.0	279	22.2	185	14.7	12	1.0	6	0.5
New Jersey	1885	22.2	1260	14.8	2341	27.6	2420	28.5	328	3.9	78	0.9
New Mexico	63	3.4	79	4.4	85	4.7	97	5.3	5	0.3	14	0.8
New York	3744	19.8	2400	12.7	4442	23.5	4730	25.1	559	3.0	176	0.9
North Carolina	2570	32.0	1059	13.2	1196	14.9	1742	21.7	115	1.4	134	1.7
North Dakota	35	5.3	26	4.0	19	2.9	25	3.8	1	0.1	9	1.4
Ohio	4223	36.1	2024	17.3	1783	15.3	3054	26.1	204	1.7	328	2.8
Oklahoma	536	15.3	466	13.3	224	6.4	489	14.0	26	0.7	78	2.2
Oregon	35	1.0	238	6.8	1263	36.3	252	7.3	82	2.3	24	0.7
Pennsylvania	3864	31.1	2118	17.1	2431	19.6	3114	25.1	274	2.2	193	1.6
Rhode Island	145	14.1	128	12.5	237	23.1	178	17.3	20	2.0	6	0.6
South Carolina	1196	29.3	532	13.1	575	14.1	846	20.8	60	1.5	66	1.6
South Dakota	70	9.2	55	7.2	29	3.8	51	6.7	1	0.2	14	1.9
Tennessee	1787	31.1	928	16.2	641	11.2	1053	18.3	95	1.7	117	2.0
Texas	2835	13.4	3583	17.0	1869	8.8	3239	15.3	642	3.0	317	1.5
Utah	58	2.6	88	3.9	107	4.8	145	6.5	6	0.3	10	0.5
Vermont	57	9.2	36	5.8	69	11.2	56	9.1	3	0.5	3	0.5
Virginia	2433	33.8	1153	16.0	1416	19.7	1608	22.4	121	1.7	120	1.7
Washington	50	0.8	308	5.1	1625	26.9	554	9.2	149	2.5	38	0.6
West Virginia	683	36.5	269	14.4	243	13.0	307	16.4	23	1.2	31	1.6
Wisconsin	981	17.9	728	13.3	770	14.1	1083	19.8	52	1.0	130	2.4
Wyoming	15	3.0	23	4.7	9	1.8	10	2.1	1	0.1	3	0.6



**Table 6**

Number of premature mortalities (NM) and mortality rate (MR) per year due to PM<sub>2.5</sub> concentrations attributable to different sectors in the 20 most populous metropolitan areas (M) and cities (C) of the CONUS (2005 data). Mortality rate (MR) corresponds to number of deaths per year per 100,000 people within the state.

City/MA	Electric gen		Industry		Comm/Res		Road		Marine		Rail	
	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR
New York City (M)	2571	20.3	1713	13.5	3555	28.0	3615	28.5	483	3.8	103	0.8
Los Angeles (M)	137	1.5	1854	20.6	1891	21.1	2092	23.3	1505	16.8	90	1.0
Chicago (M)	1102	22.7	1378	28.4	716	14.8	1379	28.4	56	1.1	171	3.5
Detroit (M)	657	23.2	593	21.0	292	10.3	790	27.9	28	1.0	46	1.6
Philadelphia (M)	573	27.1	404	19.1	535	25.3	591	28.0	79	3.7	25	1.2
Boston (M)	242	12.4	546	28.0	682	35.0	540	27.7	47	2.4	13	0.7
Washington (M)	655	35.2	290	15.6	560	30.1	533	28.6	24	1.3	32	1.7
San Jose (M)	11	0.6	202	11.0	433	23.4	199	10.8	126	6.8	8	0.4
Houston (M)	255	14.1	506	27.9	258	14.2	304	16.8	158	8.7	25	1.4
San Diego (M)	56	3.4	143	8.7	339	20.7	288	17.5	201	12.3	12	0.7
Minn.-Saint Paul (M)	203	12.5	318	19.5	253	15.5	341	20.9	13	0.8	43	2.6
Dallas (M)	280	17.4	329	20.5	209	13.0	374	23.2	20	1.3	29	1.8
Baltimore (M)	475	34.7	368	26.9	441	32.2	430	31.4	35	2.6	25	1.8
Phoenix (C)	34	2.6	89	7.0	141	11.1	225	17.7	11	0.8	11	0.8
Cleveland (M)	466	36.8	222	17.6	222	17.5	384	30.3	32	2.5	37	2.9
Miami (C)	127	10.2	70	5.6	80	6.4	128	10.3	61	4.9	5	0.4
Denver (M)	53	4.4	50	4.2	128	10.7	103	8.6	1	0.1	7	0.6
Saint Louis (M)	280	26.8	204	19.5	141	13.5	235	22.5	22	2.1	31	2.9
Kansas City (C)	208	20.1	163	15.8	109	10.6	199	19.2	8	0.7	47	4.5

uniformly in the central-eastern part of the U.S., with a peak in the Midwest. Yearly averaged population-weighted concentration of rail-attributable PM<sub>2.5</sub> is 0.20 µg m<sup>-3</sup>.

### 3.3. Ozone impacts

The impact on ozone concentrations is related to the atmospheric concentrations of VOC and NO<sub>x</sub>. Fig. 3 shows the average daily maximum concentration of ozone attributable to road transportation emissions. Daily maximum ozone is temporally averaged only during the ozone season (Apr–Sep), consistent with EPA practice. Road mobile emissions induce a domain-wide increase in daily maximum seasonal ozone concentrations, except for some major urban areas (e. g. Miami), where the high background NO<sub>x</sub> concentrations account for a decrease in the ozone concentrations due to the additional NO<sub>x</sub> emitted by road vehicles.

Road transportation provides the most significant impact over ozone exposure among the combustions emission sources considered in this study. From Table 3, the population-weighted mean daily maximum ozone concentration due to vehicle emissions is 6.90 ppb, about three times larger than the population-weighted concentration change due to electric generation (2.15 ppb) and industry (2.06 ppb). Commercial/residential activities, as well as shipping and rail emissions, have an impact on the mean daily maximum ozone concentration below 1 ppb.

### 3.4. Health impacts

Premature deaths from cardiovascular diseases and lung cancer due to long-term exposures to PM<sub>2.5</sub> attributable to each sector are evaluated by applying the CRF described in Section 2.4, and are given in Table 4. Aggregated combustion emissions account for a total of about 200,000 (90% CI: 90,000–361,000) PM<sub>2.5</sub>-related premature mortalities per year in the U.S. This result is comparable with total mortalities estimated by similar studies (U.S. EPA, 2011a; Fann et al., 2012). The distribution of early deaths among the different sectors reflects the population-weighted average PM<sub>2.5</sub> sector-attributable concentrations shown in Table 3.

The two largest contributors to PM<sub>2.5</sub>-related premature deaths in the U.S. are road transport and power generation, accounting for 53,000 (90% CI: 24,000–95,000) and 52,000 (90% CI: 23,000–94,000) early deaths per year, respectively.

Commercial/residential sources and industry account for 42,000 (90% CI: 19,000–76,000) and 41,000 (90% CI: 18,000–74,000) early deaths, respectively. About 8000 (90% CI: 4000–15,000) deaths per year are attributable to marine transport and 4500 (90% CI: 2000–8000) to rail transport. Aviation mortalities are included in the table as estimated by Yim et al. (2013): a total of 1200 (90% CI: 550–2600) PM<sub>2.5</sub>-related mortalities per year are attributable to full flight aviation emissions in North America.

Table 5 allocates the PM<sub>2.5</sub>-related premature mortalities for each sector shown in Table 4 in the 48 states (and the District of Columbia) of the CONUS. This table displays for each state both the absolute number of premature deaths per year and the mortality rate, defined as number of early deaths per year per 100,000 people within the state.

CMAQ gridded results for each sector are attributed to each state using the code ArcGIS (ESRI, 2008). In terms of absolute impact of PM<sub>2.5</sub> combustion emissions, the most affected region is California, with about 21,000 early deaths per year. Of these, about 12,000 come from both commercial/residential sources and road transportation, and ~5000 from industry. About 3500 premature deaths per year in this state are attributable to marine transportation emissions, which exhibit a peak in Southern California (Fig. 1e).

The data in Table 5 show a large impact of electric generation emissions in the central-eastern U.S. and in the Midwest. This reflects the trend shown in Fig. 2b for power generation-related sulfate concentrations. In particular, with a mortality rate (MR) of about 40 premature deaths per year per 100,000 inhabitants in Kentucky, electric generation is the sector responsible for the highest mortality rate among the U.S. states.

Road transportation, consistent with its annual mean PM<sub>2.5</sub> concentration map (Fig. 1d), exhibits the most widespread distribution of sector-attributable premature deaths among the U.S. states. In terms of relative impacts, the state characterized by the highest relative mortality due to all the sectors is Maryland, with about 114 early deaths per year every 100,000 inhabitants.<sup>1</sup>

<sup>1</sup> It should be noted that the total number of early deaths given in Table 5 for each sector does not exactly coincide with the values of Table 4 for the whole U.S. This is due to slight inaccuracies in the allocation of the gridded population distribution within state boundaries, which yields an average error of 0.9% in the estimate of the cumulative number of deaths per each sector.

Table 7

Number of premature mortalities (NM) and mortality rate (MR) per year due to ozone concentrations attributable to different sectors in the 48 states of the CONUS (plus District of Columbia). Mortality rate (MR) corresponds to number of deaths per year per 100,000 people within the state.

State	Electric gen		Industry		Comm/Res		Road		Marine		Rail	
	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR
Alabama	97	2.13	69	1.51	14	0.31	240	5.27	22	0.49	24	0.52
Arizona	41	0.81	47	0.92	19	0.37	403	7.94	16	0.32	30	0.59
Arkansas	50	1.90	46	1.72	6	0.21	120	4.53	15	0.56	18	0.66
California	8	0.02	43	0.12	22	0.06	209	0.60	49	0.14	12	0.03
Colorado	27	0.62	23	0.54	3	0.08	57	1.33	1	0.03	7	0.17
Connecticut	-2	-0.06	-2	-0.07	-1	-0.04	-12	-0.35	-1	-0.02	0	-0.01
Delaware	-1	-0.08	-1	-0.07	0	-0.03	-3	-0.36	0	-0.03	0	-0.02
DC	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Florida	175	1.10	97	0.61	82	0.52	191	1.20	9	0.06	22	0.14
Georgia	108	1.31	77	0.94	19	0.23	396	4.80	24	0.30	28	0.34
Idaho	2	0.15	6	0.43	1	0.07	16	1.20	1	0.07	2	0.17
Illinois	12	0.09	9	0.07	2	0.01	24	0.19	3	0.02	5	0.04
Indiana	-1	-0.01	0	-0.01	0	0.00	-3	-0.04	0	0.00	0	0.00
Iowa	46	1.56	36	1.20	6	0.20	97	3.24	5	0.18	19	0.64
Kansas	44	1.57	43	1.56	4	0.16	88	3.20	5	0.16	17	0.61
Kentucky	24	0.58	13	0.30	2	0.06	48	1.15	5	0.11	5	0.13
Louisiana	65	1.44	109	2.40	8	0.18	163	3.58	75	1.66	17	0.38
Maine	-1	-0.05	-1	-0.07	-1	-0.04	-5	-0.36	0	-0.04	0	-0.01
Maryland	-4	-0.07	-3	-0.06	-1	-0.02	-16	-0.29	-1	-0.02	-1	-0.02
Massachusetts	-3	-0.05	-2	-0.04	-2	-0.03	-4	-0.06	-1	-0.02	0	0.00
Michigan	-1	-0.01	-1	-0.01	0	0.00	-3	-0.03	0	0.00	0	0.00
Minnesota	54	1.08	42	0.84	9	0.18	119	2.39	6	0.12	21	0.42
Mississippi	51	1.76	50	1.73	6	0.22	135	4.68	26	0.91	16	0.55
Missouri	72	1.25	48	0.85	8	0.14	144	2.52	12	0.21	26	0.46
Montana	2	0.20	2	0.26	0	0.04	8	0.92	1	0.06	2	0.17
Nebraska	26	1.48	23	1.33	2	0.14	48	2.75	2	0.11	12	0.70
Nevada	2	0.12	4	0.19	1	0.08	20	1.05	1	0.07	2	0.11
New Hampshire	-1	-0.05	-1	-0.05	0	-0.03	-4	-0.28	0	-0.01	0	-0.01
New Jersey	-2	-0.03	-3	-0.04	-2	-0.02	-3	-0.04	1	0.01	0	-0.01
New Mexico	40	2.22	55	3.03	5	0.30	127	7.02	5	0.28	19	1.06
New York	-7	-0.04	-9	-0.05	-5	-0.03	-16	-0.09	2	0.01	-2	-0.01
North Carolina	150	1.86	98	1.22	31	0.38	489	6.08	32	0.40	33	0.41
North Dakota	8	1.16	5	0.79	1	0.11	12	1.78	0	0.07	3	0.52
Ohio	-2	-0.02	-1	-0.01	0	0.00	-6	-0.05	0	0.00	0	0.00
Oklahoma	72	2.06	95	2.71	9	0.25	222	6.33	13	0.37	25	0.71
Oregon	4	0.10	7	0.21	4	0.13	36	1.03	8	0.23	3	0.08
Pennsylvania	-10	-0.08	-7	-0.06	-3	-0.02	-37	-0.30	-1	-0.01	-2	-0.02
Rhode Island	-1	-0.07	-1	-0.06	0	-0.04	-4	-0.40	-1	-0.05	0	-0.01
South Carolina	73	1.79	53	1.30	15	0.36	260	6.38	20	0.50	18	0.43
South Dakota	12	1.58	10	1.30	1	0.14	21	2.75	1	0.11	6	0.73
Tennessee	101	1.76	67	1.17	13	0.23	277	4.82	23	0.39	27	0.48
Texas	252	1.19	495	2.34	43	0.20	1052	4.98	163	0.77	88	0.42
Utah	9	0.42	6	0.27	1	0.06	27	1.21	1	0.05	3	0.13
Vermont	0	-0.07	0	-0.07	0	-0.03	-2	-0.39	0	-0.02	0	-0.02
Virginia	39	0.54	22	0.31	7	0.09	69	0.95	-20	-0.28	7	0.10
Washington	3	0.05	5	0.08	4	0.06	29	0.48	3	0.05	2	0.04
West Virginia	-1	-0.03	0	-0.01	0	-0.01	-2	-0.08	0	0.00	0	0.00
Wisconsin	15	0.27	12	0.21	3	0.05	33	0.61	3	0.05	6	0.10
Wyoming	4	0.82	4	0.72	0	0.07	7	1.37	0	0.05	2	0.31

Table 6 shows the same results as Table 5 for the 20 most populous metropolitan areas in the U.S. Urban population data are retrieved from the National Atlas of the United States, 2005. As expected for all metropolitan areas, road transportation and commercial/residential sources have the largest and most uniformly distributed impact on all cities. The highest peaks of the PM<sub>2.5</sub>-related health impacts due to vehicle emissions are found in the major East coast cities: New York (MR ~ 28.5), Washington (MR ~ 28.6) and Baltimore (MR ~ 31.4). The city of Baltimore in particular is characterized by the highest total mortality rate from all combustion sources: about 130 early deaths attributable to PM<sub>2.5</sub> per year per 100,000 inhabitants. The highest absolute all-combustion sources impact is in New York, with about 12,000 total mortalities per year.

Of the set of 5695 cities considered, the highest PM<sub>2.5</sub>-attributable all-combustion mortality rate (MR ~ 144) has been found in Donaldsonville, LA. Here the presence of nine oil refineries within a

70-km radius, for a total production of ~2.2 million barrels per day (NREL, 2012), accounts for a mortality rate by industrial sources of ~81 early deaths per year per 100,000 people.

Table 4 also includes premature mortalities due to ozone concentrations attributable to the different sectors. Aggregated combustion emissions account for about 10,100 (90% CI: -1300 to 21,400) ozone-related premature deaths in the U.S. in 2005. As with PM<sub>2.5</sub>, the aggregate ozone mortality estimate is consistent with previous national emissions assessments in the U.S. (U.S. EPA, 2011a; Fann et al., 2012). The negative lower bound is a consequence of the ozone depletion occurring in densely populated cities, due to NO<sub>x</sub> emissions in NO<sub>x</sub>-saturated environments.

The main contributor is road transportation, which is responsible for more than half of the ozone-related mortalities (~5250). Both electric generation and industry account for about 1800 mortalities per year. Commercial/residential, marine and rail transport account for about 350, 530 and 540 ozone-related

mortalities annually, respectively. It is noted that, despite their relatively large contributions to PM<sub>2.5</sub> mortalities with respect to the other sectors, commercial and residential sources contribute only to a fraction of the total ozone-related early deaths. This can be explained by considering the NO<sub>x</sub> emission attributions given in Table 1. Road transportation represents the single largest contributor to NO<sub>x</sub> emissions (accounting for 38.5% of the total). Industry and electric generation both give a similar contribution to NO<sub>x</sub> emissions. This trend is reflected in the national pattern of ozone-related mortalities shown in Table 4.

Similarly to the previous tables for PM<sub>2.5</sub>, Table 7 and Table 8 provide the number of early deaths per year and the mortality rate due to ozone exposure as a consequence of emissions from the six sectors considered. Table 7 shows the data for each U.S. state, while Table 8 sorts the results for the 20 most populous metropolitan areas. The correlation between high ozone levels and high sunlight exposure, together with differences in emissions and background VOC and NO<sub>x</sub> concentrations, account for the uneven distribution of ozone-related mortalities between northern and southern states.

More than 20% of the ozone-related mortalities from all sectors (~2100 early deaths) occur in Texas, mainly as a consequence of road transportation and industrial emissions. The second most affected state is North Carolina, with about 800 ozone-related early deaths per year, half of which attributable to vehicle emissions. Smaller states with high percentage of urban areas (e. g., Maryland, Connecticut) are characterized by an ozone-related mortality reduction due all-sectors emissions. In these regions, ozone is generally depleted by additional NO<sub>x</sub> emissions. The same principle applies to many of the metropolitan areas considered in Table 8.

#### 4. Discussion

The spatial distribution and speciation of PM<sub>2.5</sub> impacts per sector can be used to inform the design of sector-specific emission mitigation measures. Premature mortalities from sulfate attributable to power plants represent approximately half of the ~52,000 mortalities from the sector. These mortalities are mainly related to SO<sub>x</sub> emissions from coal power plants, and could be reduced by promoting the purchase of low-sulfur content coal from the western deposits in the Powder River Basin in Wyoming and Montana

(Stavins and Schmalensee, 2012), the introduction of lime scrubbers, or the adoption of alternative energy sources (e. g. natural gas, as forecasted by the U.S. EIA, 2012). Similarly, the mortalities related to marine combustion emissions (of which about one third is related to sulfate concentrations) could be reduced by enforcing limits to the sulfur content of bunker fuel used in ship engines. Regulations to this effect have recently been put in place by the International Maritime Organization (IMO, 2010). In 2010 a limit of 1% fuel sulfur content for the North America Emission Control Area (ECA) was established, to be lowered to 0.1% in 2015.

In using the results of this study to inform potential mitigation measures, it is important to note that premature mortality estimates are calculated assuming equal toxicity amongst the different types of particulate matter. Recent epidemiological studies (Lippmann and Chen, 2009; Levy et al., 2012) suggest that differential toxicity amongst PM species may be significant. In an extensive multi-site time-series analysis, Levy et al. (2012) showed differences in the correlations between changes in hospital admissions and concentrations of different types of PM<sub>2.5</sub>, with black carbon showing the highest relative health impact. Furthermore, a recent ACS cohort analyses (Lippmann, 2010) indicate that PM<sub>2.5</sub> correlations with premature mortality risk may vary with source category, with coal and traffic sources having the most significant associations. Despite these findings, no epidemiological study to date has provided a conclusive assessment of the relative toxicity of different PM<sub>2.5</sub> components, sufficient to develop CRFs accounting for those differences [as per Levy et al. (2012) and current EPA practice]. It is therefore possible that future CRFs will be able to describe particulate matter health impacts by weighting PM species. Table 3 of the present study provides data appropriate for such a calculation.

An assessment of the health impacts from PM<sub>2.5</sub> and ozone concentrations attributable to different source categories in the US has been performed in parallel with the present study by Fann et al. (2013), who adopt a source apportionment approach to allocate the concentrations of PM<sub>2.5</sub> and ozone among various different source categories. Their source categories follow the NEI source classification scheme, whereas we have reprocessed inventories to correspond to what may be termed “economic” sectors. For example, the “industrial” sources in this study are split between “industrial point sources” and “area sources” in Fann

**Table 8**

Number of premature mortalities (NM) and mortality rate (MR) per year due to ozone concentrations attributable to different sectors in the 20 most populous metropolitan areas (M) and cities (C) of the CONUS (2005 data). Mortality rate (MR) corresponds to number of deaths per year per 100,000 people within the state.

City/MA	Electric Gen		Industry		Comm/Res		Road		Marine		Rail	
	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR	NM	MR
New York City (M)	-2.22	-0.017	-4.66	-0.037	-2.67	-0.021	3.76	0.030	2.93	0.023	-0.53	-0.004
Los Angeles (M)	0.24	0.003	1.42	0.016	1.52	0.017	0.95	0.011	0.02	0.000	-0.17	-0.002
Chicago (M)	-0.13	-0.003	-0.12	-0.002	0.01	0.000	0.23	0.005	-0.01	0.000	0.06	0.001
Detroit (M)	-0.02	-0.001	-0.02	-0.001	-0.01	0.000	-0.02	-0.001	0.00	0.000	0.00	0.000
Philadelphia (M)	-0.16	-0.008	-0.15	-0.007	-0.07	-0.003	-0.75	-0.035	-0.06	-0.003	-0.03	-0.002
Boston (M)	-0.42	-0.021	0.10	0.005	-0.19	-0.010	8.96	0.459	0.19	0.010	0.21	0.011
Washington (M)	-0.77	-0.041	-0.67	-0.036	-0.28	-0.015	-3.57	-0.192	-0.11	-0.006	-0.21	-0.011
San Jose (M)	0.21	0.012	1.33	0.072	0.78	0.042	5.19	0.281	6.05	0.328	0.08	0.004
Houston (M)	9.17	0.505	22.37	1.233	3.24	0.179	47.30	2.607	11.25	0.620	2.78	0.153
San Diego (M)	0.02	0.001	0.28	0.017	0.11	0.007	0.13	0.008	-0.50	-0.031	0.05	0.003
Minn.-Saint Paul (M)	9.40	0.577	6.20	0.380	1.63	0.100	21.49	1.318	0.87	0.053	3.54	0.217
Dallas (M)	4.15	0.258	6.22	0.386	0.60	0.037	16.92	1.051	1.46	0.091	1.19	0.074
Baltimore (M)	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
Phoenix (C)	4.48	0.351	6.68	0.523	3.89	0.305	71.07	5.569	2.53	0.198	4.65	0.364
Cleveland (M)	-0.08	-0.006	-0.06	-0.005	-0.02	-0.002	-0.03	-0.002	0.03	0.003	0.01	0.001
Miami (C)	0.83	0.067	8.09	0.651	12.71	1.024	-94.1	-7.582	-13.11	-1.056	0.41	0.033
Denver (M)	3.28	0.275	2.77	0.231	0.68	0.057	11.07	0.926	0.18	0.015	0.93	0.078
Saint Louis (M)	-0.04	-0.004	-0.03	-0.003	-0.01	-0.001	-0.19	-0.018	-0.01	-0.001	-0.01	-0.001
Kansas City (C)	8.55	0.827	5.03	0.486	0.83	0.081	14.76	1.429	0.83	0.080	3.01	0.291

et al. (2013), where their area sources in turn also include part of the commercial/residential emissions considered in this study. Here we make a comparison for PM<sub>2.5</sub>-related early deaths insofar as possible using Table 3 of the Fann et al. (2013) SI and assuming a nominal 12 life years lost per premature mortality for the purposes of this comparison. We note that these comparisons are not like-for-like due to the different inventory processing applied (as well as different meteorology and air quality models, and apportionment approach) and it is not clear the extent to which comparisons are appropriate. For power generation [Fann et al. (2013): electricity generating units] we estimate 52,200 early deaths per year, compared to their 51,700 using our conversion. For mobile sources [approximately our road transportation, marine transportation, rail transportation and aviation] we estimate 66,800 early deaths per year, cf. their estimate of 36,300. We note that our aircraft estimate includes cruise emissions, whereas theirs is based on a different inventory and only for landing and takeoff emissions. For industry [Fann et al. (2013): all industrial sub-categories except electricity generating units] we estimate 40,800 cf. their 22,400. However, our definition of industry includes some of their "area sources" so an upper bound on their early deaths would be 42,800. In total (excluding non-anthropogenic and transboundary pollution) Fann et al. (2013) estimates 148,000 early deaths per year, cf. our 200,000 early deaths per year. This implies that our estimates are broadly ~35% higher, although firm conclusions about individual sectors cannot be made. Additionally, we infer 16 life years lost per premature mortality for electricity generating units from their work which would expand the difference by ~30%, while our accounting for low PM<sub>2.5</sub> modeling biases in our probabilistic approach would serve to reduce the effective differences by ~25%. On a relative basis, we observe that in both assessments electric generation accounts for about 25% of the total PM<sub>2.5</sub> premature deaths. The relative importance of the aggregated transportation sectors (road, marine, rail and aviation) in the present study is higher (~33% versus ~20%) than the "mobile" sector considered in Fann et al. (2013).

## 5. Conclusions

Combustion emissions in the U.S. are found to be responsible for ~200,000 premature mortalities due to long-term exposure to increased PM<sub>2.5</sub> concentrations, and ~10,600 premature mortalities due to exposure to increased ozone concentrations. The totals computed do not consider non-linearities in the model response (e.g., in the formation of secondary PM<sub>2.5</sub>). This effect is expected to be relatively small, potentially yielding an underestimation in total mortalities of the order of 6%, as found in a study using an analogous methodology in the United Kingdom (Yim and Barrett, 2012).

Among the different sectors considered in this study, road transportation accounts for the largest number of early mortalities, ~53,000 PM<sub>2.5</sub>-related and ~5300 ozone-related. For comparison, we consider that in 2005 the number of fatalities related to car accidents in the U.S. was ~43,500 (U.S. DOT, 2012). This suggests that the air quality impact of road transportation in terms of premature deaths may likely exceed the number of fatal accidents by about 30%. It is documented (U.S. DOT, 2012) that about 40% of the fatal accidents involve people in the 0–44 years range, corresponding to a loss of about 35 life years per fatality. Emissions instead generally affect people at older ages, with an average loss of ~12 years per mortality (COMEAP, 2010), yielding a total of 0.70 million life years lost from both PM<sub>2.5</sub> and ozone exposure per year. This means that car accidents may still be the leading cause of loss of life years, despite the smaller number of fatalities. These issues related to the use of premature mortalities as a metric to assess the

health burden related to air pollution are discussed in COMEAP (2010).

Considering concentrations of different types of PM<sub>2.5</sub>, road vehicles account for a population-weighted concentration of black carbon larger than the sum of all the other sectors (Table 3).

Power generation emissions results in adverse health impacts similar to road transportation in terms of premature mortalities (Table 3). A large extent of this impact is related to sulfur dioxide emissions from coal-fired power plants. The population-weighted concentration of 1.13  $\mu\text{g m}^{-3}$  of sulfate due to electric generation is the highest among all the PM<sub>2.5</sub> species for all the sectors considered (Table 2). A reduction of sulfur dioxide emissions from power plants could therefore limit the adverse health impact of electric generation, and should be taken into account for future U.S. energy and air quality policies.

The extent of the impact on air quality by road transportation and electric power generation found in this assessment will drive the selection of future-year mitigation scenarios explored in Part II of the study.

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**Nitrous Oxide (N<sub>2</sub>O): The Dominant  
Ozone-Depleting Substance Emitted in the 21st  
Century**

A. R. Ravishankara, *et al.*  
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# Nitrous Oxide (N<sub>2</sub>O): The Dominant Ozone-Depleting Substance Emitted in the 21st Century

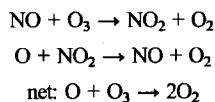
A. R. Ravishankara,\* John S. Daniel, Robert W. Portmann

By comparing the ozone depletion potential-weighted anthropogenic emissions of N<sub>2</sub>O with those of other ozone-depleting substances, we show that N<sub>2</sub>O emission currently is the single most important ozone-depleting emission and is expected to remain the largest throughout the 21st century. N<sub>2</sub>O is unregulated by the Montreal Protocol. Limiting future N<sub>2</sub>O emissions would enhance the recovery of the ozone layer from its depleted state and would also reduce the anthropogenic forcing of the climate system, representing a win-win for both ozone and climate.

The depletion of the stratospheric ozone layer by human-made chemicals, referred to as ozone-depleting substances (ODSs), was one of the major environmental issues of the 20th century. The Montreal Protocol on Substances That Deplete the Ozone Layer (1), MP, emerged from the Vienna Convention for the Protection of the Ozone Layer (2). The MP has been highly successful in reducing the emissions, growth rates, and concentrations of chlorine- and bromine-containing halocarbons, the historically dominant ODSs (3), and has limited ozone depletion and initiated the recovery of the ozone layer.

The relative contributions of various ODSs to ozone layer depletion are often quantified by the ozone depletion potential (ODP) (4). An ODP relates the amount of stratospheric ozone destroyed by the release of a unit mass of a chemical at Earth's surface to the amount destroyed by the release of a unit mass of chlorofluorocarbon 11, CFC-11 (CFCl<sub>3</sub>). ODPs are widely used for policy formulation because of their simplicity in quantifying the relative ozone-destroying capabilities of compounds.

Through the work of Crutzen (5) and Johnston (6), nitrogen oxides (NO<sub>x</sub> = NO + NO<sub>2</sub>) are also known to catalytically destroy ozone via



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The primary source of stratospheric NO<sub>x</sub> is surface N<sub>2</sub>O emissions [(7) and references therein]. N<sub>2</sub>O has been thought of as primarily a natural atmospheric constituent, but the influence of its changes on long-term changes in ozone concentrations has also been examined (8–10).

Nitrous oxide shares many similarities with the CFCs, historically the dominant ODSs. The CFCs and N<sub>2</sub>O are very stable in the troposphere, where they are emitted, and are transported to the stratosphere where they release active chemicals that destroy stratospheric ozone through chlorine- or nitrogen oxide-catalyzed processes. They both have substantial anthropogenic sources. Unlike CFCs, N<sub>2</sub>O also has natural sources, akin to methyl bromide, which is another important ODS. Assigning an ODP for N<sub>2</sub>O and separating out the natural and anthropogenic emissions are therefore no more conceptually difficult than they are for methyl bromide.

In spite of these similarities between N<sub>2</sub>O and previously recognized ODSs and in spite of the recognition of the impact of N<sub>2</sub>O on stratospheric ozone, N<sub>2</sub>O has not been considered to be an ODS in the same sense as chlorine- and bromine-containing source gases. The signatories to the Vienna Convention (2) have agreed in Article 2 (General Obligations) to "Adopt appropriate legislative or administrative measures ... to control, limit, reduce or prevent human activities under their jurisdiction or control should it be found that these activities have or are likely to have adverse effects resulting from modification or likely modification of the ozone layer." Yet N<sub>2</sub>O remains unregulated by the MP (1).

Here, we present the ODP of N<sub>2</sub>O to be positive and nonzero and show that N<sub>2</sub>O is an ozone-

depleting substance on the basis of the extent of ozone depletion it causes. Indeed, current anthropogenic ODP-weighted N<sub>2</sub>O emissions are the largest of all the ODSs and are projected to remain the largest for the rest of the 21st century.

We have calculated the ODP of N<sub>2</sub>O by using the Garcia and Solomon two-dimensional (2D) model [(11) and references therein], which is similar to models used previously for such calculations (12, 13). The ODP of N<sub>2</sub>O under current atmospheric conditions is computed to be 0.017. This value is comparable to the ODPs of many hydrochlorofluorocarbons (HCFCs) (3) such as HCFC-123 (0.02), -124 (0.022), -225ca (0.025), and -225cb (0.033) that are currently being phased out under the MP. We conclude that the value of the ODP of N<sub>2</sub>O is robust because (i) our similarly calculated ODPs for CFC-12 (1.03) and HCFC-22 (0.06) agree with the accepted values (3); (ii) ozone depletion by NO<sub>x</sub> from N<sub>2</sub>O dominates the chemical control of ozone in the mid-stratosphere (13), a region well represented with 2D models; and (iii) ozone reductions by enhanced N<sub>2</sub>O have been reported in other studies (8, 10, 14), although no published study, to the best of our knowledge, has previously presented an ODP for N<sub>2</sub>O.

We examine here a few important factors that influence the ODP of N<sub>2</sub>O. At mid-latitudes, chlorine-catalyzed ozone destruction contributes most to depletion in the lowest and upper stratospheres, that is, below and above the ozone maximum. Nitrogen oxides contribute most to ozone depletion just above where ozone concentrations are the largest. This leads to efficient ozone destruction from NO<sub>x</sub> (13). The ODP of N<sub>2</sub>O is lower than that of CFCs primarily because only ~10% of N<sub>2</sub>O is converted to NO<sub>x</sub>, whereas the CFCs potentially contribute all their chlorine.

There are important interconnections between the roles of nitrogen oxides with chlorine such that the N<sub>2</sub>O ODP may be different from the calculated value in the past and future. It is well known that nitrogen oxides dampen the effect of chlorine-catalyzed ozone destruction via the formation of ClONO<sub>2</sub>, which ties up some of the chlorine in a benign form. However, as shown by Kinnison *et al.* (9), other reactions, such as the conversion of ClO to Cl by NO, can offset the damping.

We quantify the dependence of the ODP of N<sub>2</sub>O on atmospheric concentrations of chlorine by calculating it for 1959 concentrations of strato-

spheric  $\text{Cl}_y$  (essentially preindustrial). We find the ODP for 1959 to be 0.026, showing that  $\text{Cl}_y$  concentrations have a moderate effect on the efficiency of  $\text{N}_2\text{O}$ -caused ozone destruction. These results for the 1959 and 2000  $\text{Cl}_y$  concentrations bracket the range expected for the rest of the 21st century; it shows that the  $\text{N}_2\text{O}$ 's ozone destructiveness per emitted unit mass should increase by about 50% when the stratospheric chlorine loading returns to preindustrial concentrations.

Nitrogen oxide chemistry is also dependent on odd hydrogen, bromine, and methane levels, but the dependence of  $\text{N}_2\text{O}$ 's ODP on these factors is expected to be much smaller than the effect of chlorine (13).

Whereas enhanced stratospheric sulfate aerosols after volcanic injections increase the effectiveness of chlorine to destroy ozone, they will decrease the effectiveness of  $\text{NO}_x$  emissions by sequestering the catalytically active  $\text{NO}_x$  in  $\text{HNO}_3$ . Such an influence has been observed after the Mount Pinatubo eruption (15). Therefore, we anticipate that the ODP of  $\text{N}_2\text{O}$  will be reduced when the sulfate loading is enhanced. However, high volcanic sulfate loadings are unpredictable and sporadic, and their effects are short-lived, lasting only a few years. We assess the extent of their influence by calculating ODPs at peak sulfate loadings observed after the eruption of Mount Pinatubo (13, 16).

For the remaining discussion, we will use an ODP of 0.017 as though it were independent of atmospheric conditions, atmospheric composition, and time. This value is a conservative choice for the reasons discussed above.

It is important to note that the ODP alone cannot fully quantify the impact of a chemical that is released into the atmosphere. The entire emission history, and even the potential future emission projections, must be considered by using an extensive quantity like ODP-weighted emission as a metric rather than an intensive quantity such as ODP, which only considers the ozone depletion per unit mass. Figure 1 compares the anthropogenic  $\text{N}_2\text{O}$  emissions with those from the major ODSs (now controlled under the MP) for 1987 and 2008. It is clear that ODP-weighted anthropogenic emissions of  $\text{N}_2\text{O}$  were a substantial fraction of the ODP-weighted emissions of CFC-11, CFC-12, and CFC-113 even in 1987, just before the adoption of the MP. They were likely larger than the sum of the ODP-weighted emission of halons and were much larger than that of methyl bromide.

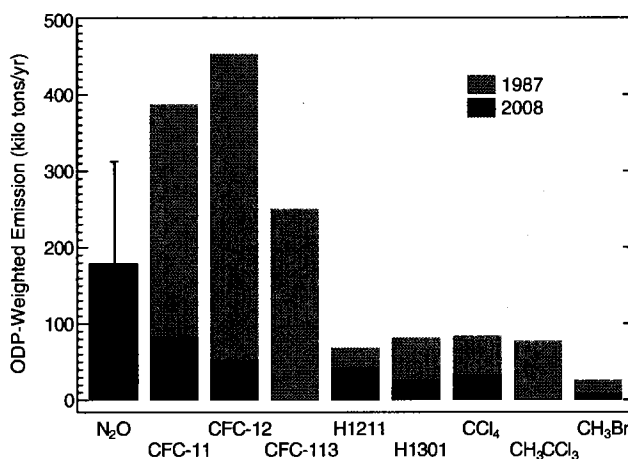
Even though  $\text{N}_2\text{O}$ 's ODP is only 0.017, roughly one-sixtieth of CFC-11s, the large anthropogenic emissions of  $\text{N}_2\text{O}$  more than make up for its small ODP, making anthropogenic  $\text{N}_2\text{O}$  emissions the single most important of the anthropogenic ODS emissions today (Fig. 1). For example, the global anthropogenic emission of  $\text{N}_2\text{O}$  now (produced mainly as a byproduct of fertilization, fossil fuel combustion and industrial processes, biomass and biofuel burning, and a few other processes) is roughly 10 million metric tons per year

compared with slightly more than a million metric tons from all CFCs at the peak of their emissions.

Figure 2 compares estimated ODP-weighted emissions of various ODSs controlled by the MP during the late 20th and all of the 21st centuries [see (13) for details of the calculation]. Recent estimates of expected future  $\text{N}_2\text{O}$  emissions under various greenhouse gas mitigation requirements continue to show that  $\text{N}_2\text{O}$  emissions are unlikely to be lower than they are today, even under the most stringent reduction requirements (17). From the top graph of Fig. 2, it is clear that  $\text{N}_2\text{O}$  is the largest ODS emission today and indeed is expected to remain the largest throughout the rest of this century for all of these emission scenarios. If anthropogenic  $\text{N}_2\text{O}$  emissions were to continue unabated, by 2050 they could represent an ODP-weighted emission in excess of 30% of the peak CFC ODP-weighted emissions of 1987. These fundamental conclusions on the influences of anthropogenic  $\text{N}_2\text{O}$  are not particularly sensitive to the uncertainties in the total anthropogenic emission rate or to the uncertainties in specific sectoral emissions (13).

It should be noted that the largest uncertainty in ODP-weighted emission comparisons comes from the uncertainties in the emission estimates of  $\text{N}_2\text{O}$ , rather than in the calculated ODP. The magnitudes of the sectoral emissions of  $\text{N}_2\text{O}$ , mostly from agricultural practices and industrial sources, are highly uncertain, but the total human-caused emissions are constrained by observed increases in  $\text{N}_2\text{O}$  concentrations and  $\text{N}_2\text{O}$ 's lifetime. The Intergovernmental Panel on Climate Change (IPCC)'s fourth assessment report estimates (18) a total annual emission during the 1990s of 17.7 TgN, of which 6.7 TgN (10.5 million metric tons of  $\text{N}_2\text{O}$ ) were anthropogenic in origin.

**Fig. 1.** Comparison of annual  $\text{N}_2\text{O}$  ODP-weighted emissions from the 1990s [IPCC, 2007 (18, 23)] with emissions of other ozone-depleting substances in 1987, when the emissions of chlorine- and bromine-containing ODSs were near their highest amount, and for 2008. Emissions during 2008 were inferred from observations taken by the Global Monitoring Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration for CFC-11, CFC-12, Halon 1211 (H1211), Halon 1301 (H1301), and  $\text{CH}_3\text{Br}$ ; all other emissions are taken from WMO (3). ODPs for all, except  $\text{N}_2\text{O}$ , are assumed to be the semi-empirical ODPs from WMO (3). Even at the height of ODS emissions in the 1980s, annual anthropogenic  $\text{N}_2\text{O}$  emissions were the fourth most important. Currently, anthropogenic  $\text{N}_2\text{O}$  emissions represent the largest contribution to ozone-depleting gas emissions. HCFC-22, the most important CFC replacement, would fall below the 1987 amount of  $\text{CH}_3\text{Br}$  for both time periods if included in the figure. The  $\text{N}_2\text{O}$  error bar represents a bottom-up uncertainty range. The lower end of the range is calculated by summing the lowest emissions estimates, and the higher end by summing the highest estimates, of the various individual sources provided by the IPCC (18).



Nitrous oxide is a greenhouse gas and is controlled under the Kyoto Protocol; it may be controlled via future climate negotiations. Therefore, it is also interesting to compare the contribution of  $\text{N}_2\text{O}$  to climate forcing with the contributions of other major greenhouse gases. The bottom graph of Fig. 2 shows the  $\text{CO}_2$  equivalent [100-year global warming potential (GWP) weighted] emissions of various non- $\text{CO}_2$  greenhouse gases. Among these gases,  $\text{N}_2\text{O}$ 's contribution to climate forcing is second only to methane and is already much larger than that of all currently recognized ODSs. These projections of ODP- and GWP-weighted  $\text{N}_2\text{O}$  emissions show that  $\text{N}_2\text{O}$  is an important gas for both the future ozone layer and climate. They also support, and now quantify, previous suggestions that reductions in  $\text{N}_2\text{O}$  emissions would benefit both the ozone layer and climate (10). Numerous  $\text{N}_2\text{O}$  mitigation options are currently available. Examples include more efficient use of fertilizer on cropland (19) and the capture and destruction of byproduct  $\text{N}_2\text{O}$  emissions in chemical processes (e.g., manufacturing adipic and nitric acids) (20). It may be more desirable to reduce nonindustrial  $\text{N}_2\text{O}$  emissions when its ozone layer depletion impact is considered in addition to its impact on climate.

The World Meteorological Organization/United Nations Environment Programme (WMO/UNEP) 2007 assessment (3) states that the largest single option available to hasten ozone layer recovery is the recapture and destruction of ODSs (mostly CFCs and halons) that are already produced but not yet emitted to the atmosphere, that is, the so-called banks. However, much of the banked halocarbons reside in applications that are generally not cost-effective to recover

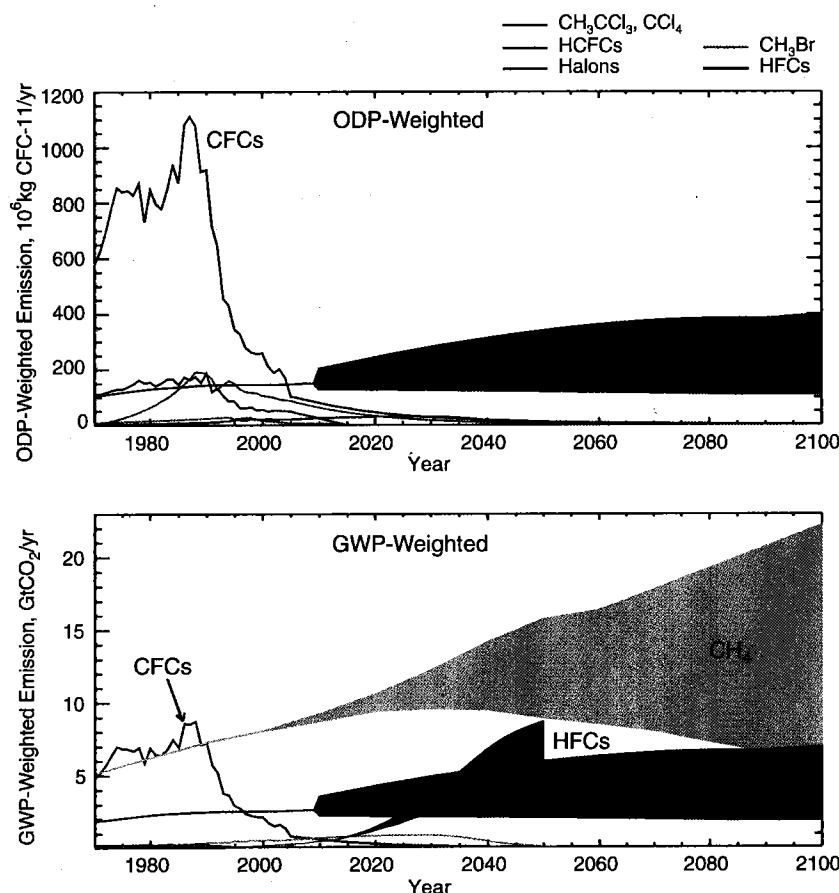


(e.g., foams in buildings) or in applications with continued demand and unavailability of suitable replacements (e.g., halons for fire fighting and CFCs for medical uses). Based on our value of the ODP and the IPCC fourth assessment report emission estimates for N<sub>2</sub>O, the total 2005 banks (3) of ODSs are equivalent to roughly 20 years of continued anthropogenic emissions of N<sub>2</sub>O at today's rate. Thus, although policy decisions regarding banks of halons and CFCs do represent the largest option for ozone protection today, the effect of N<sub>2</sub>O can be expected to dominate in the future as the banks of these ODSs are either released to the atmosphere or are captured and destroyed. Furthermore, the destruction of the existing ODS bank represents a one-time benefit, whereas reductions in N<sub>2</sub>O emissions have the ability to continue providing benefits into the future.

We also point out that increases in anthropogenic N<sub>2</sub>O emissions or decreases due to abatement strategies would affect a number of issues of importance to stratospheric ozone: (i) it would

affect the date for the recovery of the ozone layer; (ii) it would imply that the use of a single parameter such as equivalent effective stratospheric chlorine (EESC) to estimate the recovery of the ozone layer should be reevaluated; (iii) it would have implications for the recovery of the polar ozone hole that might differ from that of global ozone; (iv) N<sub>2</sub>O could be an unintended by-product of enhanced crop growth for biofuel production (21) or iron fertilization to mitigate CO<sub>2</sub> emissions (22). Such an enhancement would lead to the unintended "indirect" consequence of ozone layer depletion and increased climate forcing by an alternative fuel used to curb global warming, as pointed out by Crutzen *et al.* (21).

For historical reasons, it is interesting to compare ozone depletion caused by anthropogenic N<sub>2</sub>O emissions with that from the original projections for 500 U.S. supersonic transports (7), SSTs. The total increase in stratospheric NO<sub>x</sub> by that fleet of SSTs is comparable to that from today's total anthropogenic N<sub>2</sub>O emission, indicative of the significance of anthropogenic N<sub>2</sub>O.



**Fig. 2.** Historical and projected ODP- and GWP-weighted emissions of the most important ODSs and non-CO<sub>2</sub> greenhouse gases. Non-N<sub>2</sub>O ODS emissions are taken from WMO (3). Hydrofluorocarbon (HFC) projections are taken from Velders *et al.* (24), do not include HFC-23, and are estimated assuming unmitigated growth. The HFC band thus represents a likely upper limit for the contribution of HFCs to GWP-weighted emissions. CH<sub>4</sub> emissions represent the range of the Special Report on Emissions Scenarios (SRES) A1B, A1T, A1FI, A2, and B1 scenarios (23). The range of anthropogenic N<sub>2</sub>O emissions is inferred from the mixing ratios of these same SRES scenarios [see (13) for details of calculation].

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Figs. S1 and S2

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## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, D.C. 20240

OCT - 7 2010

Dear FLAG User:

We are pleased to provide the final revised FLAG report (FLAG 2010). FLAG was formed at the request of permit applicants and State permit review authorities to develop a more consistent and objective approach for the Federal Land Managers (FLMs), *i.e.*, National Park Service, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture Forest Service, to evaluate air pollution effects on their Air Quality Related Values (AQRVs). The FLAG effort focused on how air pollutants – primarily particulate matter, nitrogen dioxide, sulfur dioxide, nitrates, sulfates, ozone – affect the health and status of resources in areas managed by the three agencies. FLAG subgroups concentrated on four key issues: (1) visibility; (2) aquatic and terrestrial effects of wet and dry pollutant deposition; (3) terrestrial effects of ozone; and (4) process and policy issues. In December 2000, the FLMs published a final Phase I report (FLAG 2000). Based on knowledge gained and regulatory developments since FLAG 2000, the FLMs believe certain revisions to FLAG 2000 are now appropriate. The final revised FLAG 2010 report reflects those changes.

The FLAG 2010 report contains a wealth of information and should continue to be a very useful tool; we support its recommendations. The FLAG report is guidance and reflects agency direction, but it is not a rule. Nevertheless, we encourage all FLMs, permitting authorities, permit applicants, and other interested parties to take advantage of the helpful information contained in the FLAG report when assessing air pollution impacts on AQRVs.

We want to thank the many people who contributed to this important and worthwhile project.

Sincerely,

Thomas L. Strickland  
Assistant Secretary for Fish and Wildlife and Parks  
Department of the Interior

Sincerely,

Harris Sherman, Under Secretary  
Natural Resources and the Environment  
Department of Agriculture



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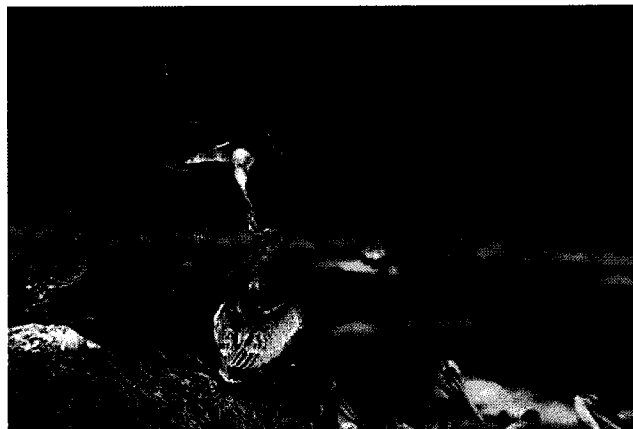
## Preface to this Edition of the FLAG Phase I Report (New)

Under the Clean Air Act, the Federal Land Manager (FLM) and the Federal official with direct responsibility for management of Federal Class I parks and wilderness areas (i.e., Park Superintendent, Refuge Manager, Forest Supervisor) have an affirmative responsibility to protect the air quality related values (AQRVs) (including visibility) of such lands, and to consider whether a proposed major emitting facility will have an adverse impact on such values. The FLM's decision regarding whether there is an adverse impact is then conveyed to the permitting authority – usually a State agency – for consideration in its determinations regarding the permit. The permitting authority's determinations generally consider a wide range of factors, including the potential impact of the new source or major modification on the AQRVs of Class I areas, if applicable.

Both State permitting agencies and permit applicants requested that the FLMs provide better consistency pertaining to their role in the review of new source permit applications near Federal Class I areas. To address this concern, the FLMs formed the Federal Land Managers' Air Quality Related Values Work Group (FLAG). The official "FLM" is the Secretary of the department with authority over the Federal Class I areas (or the Secretary's designee). For the Department of the Interior, the Secretary has designated the Assistant Secretary for Fish and Wildlife and Parks as the FLM, whereas the Secretary of Agriculture has delegated the FLM responsibilities to the Regional Forester, and in some cases, the Forest Supervisor.

The purpose of FLAG is twofold: (1) to develop a more consistent and objective approach for the FLMs to evaluate air pollution effects on public AQRVs in Class I areas, including a process to identify those resources and any potential adverse impacts, and (2) to provide State permitting authorities and potential permit applicants consistency on how to assess the impacts of new and existing sources on AQRVs in Class I areas, especially in the review of Prevention of Significant Deterioration (PSD) of air quality permit applications. Under the Clean Air Act, the FLM formal "affirmative responsibility" role in the permitting process is limited to the extent a proposed new or modified source may affect AQRVs in a Class I area.<sup>1</sup>

1. Nevertheless, the FLMs are also concerned about resources in Class II parks and wilderness areas because they have other mandates to protect those areas as well. The information and procedures outlined in this document are generally applicable to evaluating the effect of new or modified sources on the AQRVs in both Class I and Class II areas, including the evaluation of effects as part of Environmental Assessments and/or Environmental Impact Statements under the National Environmental Policy Act (NEPA). However, FLAG does not preclude more refined or regional analyses being performed under NEPA or other programs.



Adult Brown Pelicans on Breton Island National Wildlife Refuge, Louisiana.  
Credit: USFWS

FLAG members include representatives from three of the federal land management agencies that administer Federal Class I areas: the U.S. Forest Service (USFS), under the Department of Agriculture, and the National Park Service (NPS) and U.S. Fish and Wildlife Service (FWS) under the Department of the Interior, hereafter referred to as "the Agencies" or the "FLMs." In addition, five Tribal governments each administer their redesignated Class I areas, and the Bureau of Land Management (BLM) jointly administers four mandatory Federal Class I areas with the USFS. BLM is not a member of FLAG. However, because BLM does manage federal PSD Class I lands, as well as large amounts of acres in the vicinity of many FLAG Agencies' Class I areas, they may apply, when appropriate, the assessment methodologies outlined in the FLAG report. Applicants with the potential to adversely impact visibility or other AQRVs at PSD Class I areas administered by the BLM should contact that agency directly to discuss their considerations. The Agencies review permit applications for projects that may impact their areas, and make recommendations to their respective FLM as to whether or not those impacts might be considered adverse. The FLM will then make the final decision regarding the nature of the potential impacts to AQRVs, which is then conveyed to the permitting authority for its consideration.

In December 2000, after undergoing a public review and comment process that included a 90 day public comment period announced in the *Federal Register* and a public meeting, the FLMs published a *FLAG Phase I Report* (FLAG 2000), along with an accompanying "Response to Public Comments" document. The FLAG 2000 report described the work accomplished in Phase I of the FLAG effort. FLAG 2000 provided State permitting authorities and potential permit applicants a consistent methodology for conducting Class I area impact analyses. At that time, the Agencies envisioned a FLAG Phase II to address unresolved issues

including those that will require research and the collection of new data. However, resource constraints have prevented the Agencies from embarking on a formal FLAG Phase II process, but the Agencies have made significant progress in obtaining effects-based information as part of their resource-protection responsibilities. This information is included in this revised report.

The Agencies formed three separate subgroups to deal with area specific technical and policy issues associated with visibility impairment, ozone effects on vegetation, and effects of pollutant deposition on soils and surface waters. FLAG 2000 consolidated the results of those three subgroups.

FLAG 2000 included recommendations for completing and evaluating New Source Review (NSR) projects that may affect federally protected areas. It was intended to be a screening tool to help the Agencies and permit applicants determine whether impacts would be negligible. It was not intended to provide a bright-line test that would allow one to determine whether or not a proposed source of air pollution would cause or contribute to an adverse impact on AQRVs. That determination remains a project-specific management decision of the FLM. Among other factors, the FLMs' assessment of whether or not an adverse impact would occur is based on the sensitivity of the AQRVs at the particular federally protected area under consideration, and the magnitude, frequency, duration, timing, and geographic extent of the estimated new source impacts. This report (FLAG 2010) reaffirms these intentions.

FLAG 2000 has been a useful tool to the Agencies, State permitting authorities, and permit applicants. It was intended to be a working document that would be revised as necessary as the Agencies learn more about how to better assess the health and status of AQRVs. Based on knowledge gained and regulatory developments since FLAG 2000, the Agencies believe certain revisions to FLAG 2000 are now appropriate. This revised report (FLAG 2010) reflects those changes. However, it is important to emphasize that in this revision the Agencies have made certain changes to update specific information and data, but retain intact much of the background and general information contained in FLAG 2000 (e.g., Appendices A through H). Therefore, while this version replaces FLAG 2000, FLAG 2010 does not constitute a comprehensive update of all the information and material contained in FLAG 2000. Instead, the Agencies have focused their efforts on those areas of FLAG 2000 that have received the most attention and concern from permit applicants and permitting authorities. In that regard, the Agencies have included substantial changes to the visibility analysis sections, as well as included a more detailed discussion of the factors that the FLMs will use in the decision making process for an adverse impact determination. The Agencies have also taken this opportunity to discuss some key regulatory developments since FLAG 2000, as well as update some information in the FLAG 2000 deposition and ozone

sections. To aid the FLAG user wanting to focus on the most recent changes, the Agencies have identified those new and revised sections throughout the FLAG 2010 report.

The most significant changes in this FLAG 2010 revision are summarized as follows:

- Adopts similar criteria derived from EPA's 2005 Best Available Retrofit Technology (BART) guidelines for the Regional Haze Rule to screen out from AQRV review those sources with relatively small amounts of emissions located a large distance from a Class I area (i.e.,  $Q/D \leq 10$ , for sources located greater than 50 km away).
- Utilizes the most recent EPA estimates to determine annual average or 20% best natural visibility conditions for Class I areas, using the new EPA-approved visibility algorithm.
- Adopts criteria derived from the 2005 BART guidelines that utilizes monthly average relative humidity adjustment factors to minimize the effects of weather events (i.e., short-term meteorological phenomena) on modeled visibility impacts.
- Adopts criteria derived from the 2005 BART guidelines that sets a 98<sup>th</sup> percentile value to screen out roughly seven days of haze-type visibility impairment per year.
- Includes deposition analysis thresholds and concern thresholds for nitrogen and sulfur deposition impacts on vegetation, soils, and water.
- Increases transparency and consistency of factors considered for adverse impact determinations.

A comparison of these FLAG 2010 changes to information contained in FLAG 2000 is provided in Table 1:

Other changes of note included in FLAG 2010 are:

- Clarifies the near field visibility analysis techniques for analyzing plumes or layers viewed against a background;
- Expands discussion of "Critical Loads" to reflect some significant developments in this area since FLAG 2000;
- Updates ozone sensitive species lists contained in Appendix 3.A of the FLAG 2000 report, but now includes that information on individual agency web sites rather than in the FLAG 2010 report;
- Replaces Appendix 3.B of FLAG 2000 (W126 and N100 ozone values) with current information on the individual agency web sites;
- Updates the information contained in Table D-2 of FLAG 2000 to reflect current information, but now includes that information on individual agency web sites rather than in the FLAG 2010 report;
- Replaces the dated sulfate, nitrate, and ammonium ion concentration maps (Figures D-2, D-3, and D-4 of FLAG 2000), with a reference to the NADP site for current trends data.

**Table 1. FLAG 2000 vs. FLAG 2010 Analyses**

	FLAG 2000	FLAG 2010
Annual emissions/Distance (Q/D) screening criteria. (Not applicable for Class I increment analyses).	None	$\leq 10$ (sum of certain pollutant emissions (TPY) divided by distance (km) from Class I area; applies to all AQRVs, not just visibility. See section 3.2.
Background Visibility Conditions.	Based on annual average natural, using NAPAP estimates.	Based on annual average natural, or 20% best natural, using EPA data from Regional Haze Rule development. See section 3.3.3.
Relative Humidity Adjustment Factor (f(RH)).	Hour-by-hour (with RH capped at 98%).	Monthly average (with RH capped at 95%). See section 3.3.3.
First Level Screening Model.	CALPUFF or CALPUFF-lite.	CALPUFF only. See section 3.3.3.
Visibility Assessment Criteria.	Maximum modeled value.	98 <sup>th</sup> percentile modeled value at any receptor. See section 3.3.3.
Deposition Analysis Thresholds/Concern Thresholds	None	Provided for nitrogen and sulfur deposition. See section 3.5.6.
Adverse Impact Determination Criteria.	"Likely to Object" if 10% threshold exceeded; regulatory factors implicitly considered.	Adverse impact determination process more explicit; considers regulatory and other factors. See sections 4.2-4.4

## Executive Summary (Revised)

The Federal Land Managers' Air Quality Related Values Work Group (FLAG) formed to develop a more consistent approach for the Federal Land Managers (FLMs) to evaluate air pollution effects on resources. As discussed in the Preface, the *FLAG Phase I Report* (FLAG 2000) is being revised in part at this time. The primary—but not sole—focus of FLAG is the New Source Review (NSR) program, especially in the review of Prevention of Significant Deterioration (PSD) of air quality permit applications. The goals of FLAG have been to provide consistent policies and processes both for identifying air quality related values (AQRVs) and for evaluating the effects of air pollution on AQRVs, primarily in Federal Class I air quality areas, but also in some instances, in other national parks, national forests, national wildlife refuges, wilderness areas, and national monuments. Federal Class I areas are defined in the Clean Air Act as national parks over 6,000 acres and wilderness areas and memorial parks over 5,000 acres, established as of 1977. All other FLM areas are designated Class II. Maps of the Agencies' Federal Class I areas are provided in Appendix E.

FLMs have an “affirmative responsibility” to protect AQRVs. In this respect, the FLM role consists of considering whether emissions from a new or modified source may have an adverse impact on AQRVs and providing comments to permitting authorities (States or EPA). FLMs have no permitting authority under the Clean Air Act, and they have no authority under the Clean Air Act to establish air quality-related rules or standards. It is important to emphasize that the FLAG report only explains factors and information the FLMs expect to use when carrying out their consultative role. It is separate from Federal regulatory programs.

FLAG members include representatives from the three primary agencies that administer the nation's Federal Class I areas: the U.S. Forest Service (USFS), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (FWS). (Subsequently in this report, these three agencies collectively will be referred to as “the Agencies” or the “FLMs.” Class I and Class II air quality areas are called “FLM areas” in this report.) Appendix F contains a list of participants that worked on the original FLAG 2000 report.

This report describes the work accomplished in Phase I of the FLAG effort as revised to reflect current developments. That work includes identifying policies and processes common to the FLMs (herein called “commonalities”) and developing new policies and processes using readily available information. This report provides State permitting authorities and potential permit applicants a consistent and predictable process for assessing the impacts of new and existing sources on AQRVs, including a process to identify those AQRVs and potential adverse impacts. The report also



Marble Mountain Wilderness, California.  
Credit: Steve Boutcher

discusses considerations unrelated to new source review and managing emissions in Federal areas. If and when the Agencies embark on Phase II, FLAG will address unresolved issues including those that will require research and the collection of new data.

This revised *FLAG Phase I Report* consolidates the results of the FLAG Visibility, Ozone, and Deposition subgroups. The chapters prepared by these subgroups contain issue-specific technical and policy analyses, recommendations for evaluating AQRVs, and information for completing and evaluating NSR permit applications. This information and the associated NSR recommendations are intended for use by the FLMs, permitting authorities, NSR permit applicants, and other interested parties. The report includes background information on the roles and responsibilities of the FLMs under the NSR program.

This document includes recommendations for completing and evaluating NSR applications that may affect Class I FLM areas. This information can also be used to evaluate impacts on Class II parks and wilderness areas. It does not provide a universal formula that would, in all situations, allow one to determine whether or not a source of air pollution causes or contributes to an adverse impact. That determination remains a project-specific management decision, the responsibility for which remains with the FLM, as delegated by Congress. The FLM's assessment of whether or not an adverse impact would occur is based on the sensitivity of the AQRVs at the particular FLM area under consideration, as well as the consideration of several other factors, including the magnitude, frequency, duration, timing, and geographic extent of the new source's impacts.

To provide information for the FLM's assessment of adverse impacts on AQRVs, the permit applicant should identify the potential impacts of the source on all applicable AQRVs of that area. An FLM may ask that an applicant address any or all of the areas of concern. The primary areas of concern to the FLMs with respect to air pollution emissions are

visibility impairment, ozone effects on vegetation, and effects of pollutant deposition on soils and surface waters.

The *FLAG Phase I Report* also describes the FLAG effort, including the FLAG approach, organization, and plans for future FLAG work. Appendix A of the report contains a glossary of technical terms, abbreviations, and acronyms used in the report along with associated definitions. Appendix G provides a list of all references cited in the FLAG report.

The key recommendations developed by the Visibility, Ozone, and Deposition subgroups are summarized below, and updated in part in this FLAG 2010 revision. However, for all three subject matter areas, FLAG recommends that the permit applicant consult with the appropriate permitting authority and with the FLM for the affected area(s) for confirmation of preferred procedures. This consultation should take place in the early stages of the permit application process.

## Recommendations for Evaluating Visibility Impacts (Revised)

FLAG provides recommendations, specific procedures, and interpretation of results for assessing visibility impacts of new or modified sources on Class I area resources.<sup>2</sup>

FLAG addresses assessments for sources proposed for locations near (generally within 50 km) and at large distances (greater than 50 km) from these areas. The key components of the recommendations are highlighted below.

In general, FLAG recommends that an applicant:

- Apply the Q/D test (see “INITIAL SCREENING TEST” below) for proposed sources greater than 50 km from a Class I area to determine whether or not any further visibility analysis is necessary.
- Consult with the appropriate regulatory agency and with the FLM for the affected Class I area(s) or other affected area for confirmation of preferred visibility analysis procedures.
- Obtain FLM recommendation for the specified reference levels (estimate of natural conditions) and, if applicable, FLM recommended plume/observer geometries and model receptor locations.

2. Nevertheless, the FLMs are also concerned about resources in Class II parks and wilderness areas because they have other mandates to protect those areas as well. The information and procedures outlined in this document are generally applicable to evaluating the effect of new or modified sources on the AQRVs in both Class I and Class II areas, including the evaluation of effects as part of Environmental Assessments and/or Environmental Impact Statements under the National Environmental Policy Act (NEPA). However, FLAG does not preclude more refined or regional analyses being performed under NEPA or other programs.

- Apply the applicable EPA Guideline, steady-state models for regions within the Class I area that are affected by plumes or layers that are viewed against a background (generally within 50 km of the source).
  - Calculate hourly estimates of changes in visibility, as characterized by the change in the color difference index ( $\Delta E$ ) and plume contrast (C), with respect to natural conditions, and compare these estimates with the thresholds given in section 3.3.3.
- For regions of the Class I area where visibility impairment from the source would cause a general alteration of the appearance of the scene (generally 50 km or more away from the source or from the interaction of the emissions from multiple sources), apply a non-steady-state air quality model with chemical transformation capabilities (refer to EPA’s *Guideline on Air Quality Models*), which yields ambient concentrations of visibility-impairing pollutants. At each Class I receptor:
  - Calculate the change in extinction due to the source being analyzed, compare these changes with the reference conditions, and then compare these results with the thresholds given in section 3.3.3.
  - Utilize estimates of annual average natural visibility conditions for each Class I area as presented in Table 6, unless otherwise recommended by the FLM or permitting authority. Alternative estimates of visibility conditions are provided in Table 5 for consistency with State agencies that elected to use 20% best visibility for regional haze or BART implementations, or when FLMs recommend using the 20% best visibility as natural background.
- If first-level modeling results are above levels of concern, continue to consult with the Agencies to discuss other considerations (e.g., possible impact mitigation, more refined analyses).

This review process for distant/multi-source applications is portrayed schematically in Figure 1.

## Recommendations for Evaluating Ozone Impacts (Revised)

- FLM actions or specific requests on a permit application will be based on the existing air pollution situation at the area they manage. These conditions include (1) whether or not actual ozone damage has occurred in the area, and (2) whether or not ozone exposure levels occurring in the area are high enough to cause damage to vegetation (i.e., phytotoxic O<sub>3</sub> exposures). Figure 2 shows the FLM review process to assess ozone impacts for a project that exceeds the initial annual emissions over distance (Q/D) screening criteria. As noted in Figure 2, ambient ozone concentrations are considered along with data from exposure response studies (EPA 2007b) to determine whether a source will cause or contribute to phytotoxic



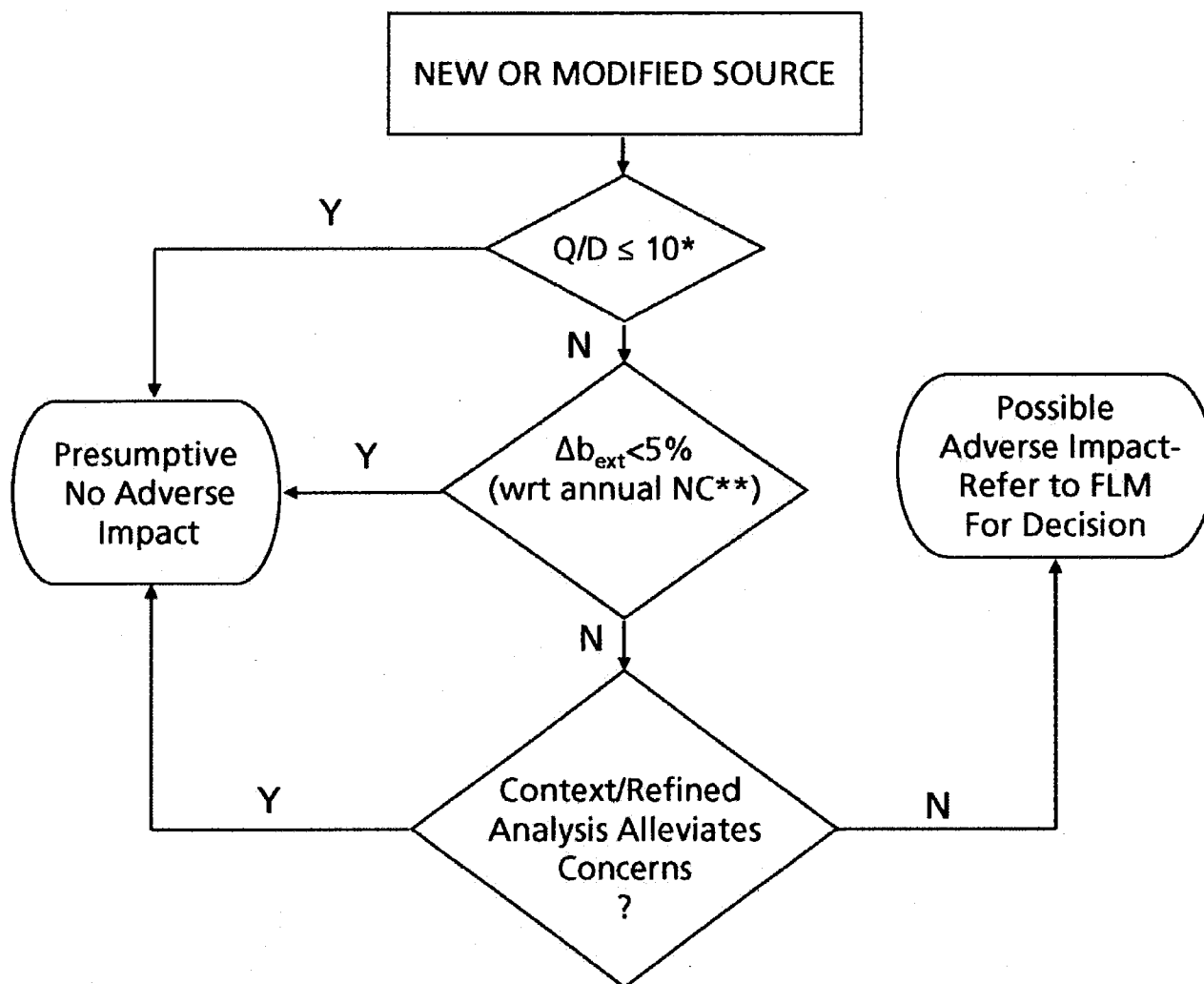


Figure 1. Procedure for Visibility Assessment for Distant/Multi-Source Applications (Revised)

\*Q/D test only applies to sources located greater than 50 km from a Class I area.

\*\*Difference Change in the 98th percentile with respect to (wrt) the annual average Natural Condition (NC). Applicant should use the 20th percentile best natural condition background if recommended by the FLM or permitting authority.

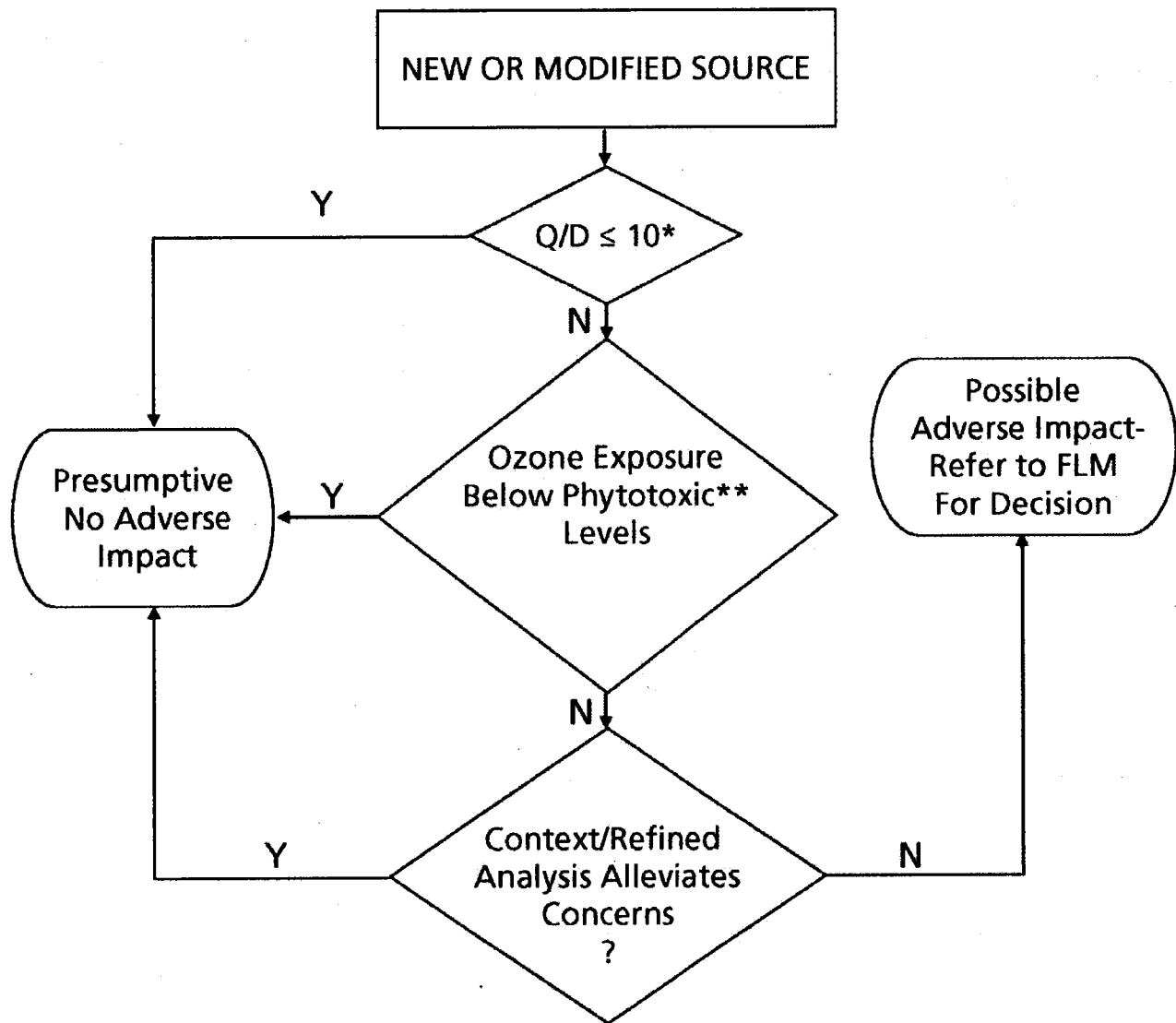
ozone levels (i.e., levels toxic to plants) at the affected site. The FLM may ask the applicant to calculate the ozone exposure values if these data are not already available. Ozone damage to vegetation is determined from field observations at the impacted site.

- Oxidant stipple necrosis on plant foliage and ozone-induced senescence infer adverse physiological or ecological effects, and are considered to be damage if they are determined to have a negative impact on aesthetic value.
- Established ozone metrics to describe ozone exposure are referenced.

- NO<sub>x</sub> and VOC emissions are of concern because they are precursors of ozone. Current information indicates most FLM areas are NO<sub>x</sub> limited. Until we determine the VOC or NO<sub>x</sub> status of each area, we will focus on NO<sub>x</sub> emission sources.

### Recommendations for Evaluating Deposition Impacts (Revised)

For a project that exceeds the initial annual emissions over distance (Q/D) screening criteria, the permit applicant should consult with the appropriate regulatory agency and FLM for the affected area(s) to determine if a deposition impact analysis should be done (i.e., expected sulfur and/



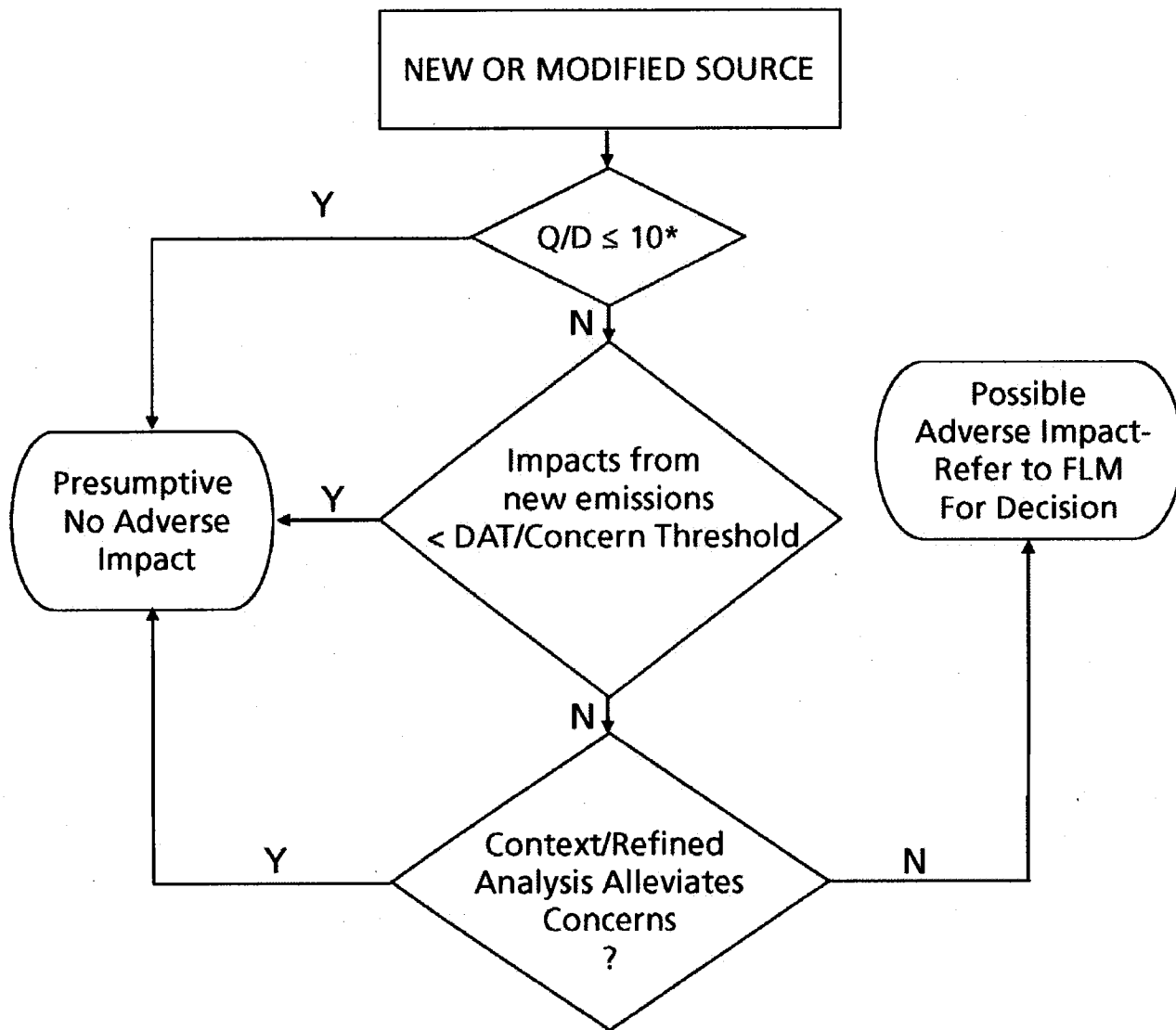
**Figure 2. FLM Assessment of Potential Ozone Effects from New Emissions Source (Revised)**

\*Q/D test only applies to sources located greater than 50 km from a Class I area.

\*\*Note: Ambient ozone concentrations are considered along with data from exposure response studies (EPA 2007b) to determine whether a source will cause or contribute to phytotoxic ozone levels (i.e., levels toxic to plants) at the affected site.

or nitrogen deposition impacts are above the Deposition Analysis Threshold (DAT) or concern threshold (see section 3.5.6). Please note that although mercury and other toxic emissions are of interest to the FLM, the deposition impact analyses discussed here applies only to nitrogen and sulfur emissions. If an analysis is advised, the permit applicant should obtain available information on Class I AQRVs, critical loads, and concern thresholds from the FLM. In addition, the applicant should refer to section 3.5.6 'Recommendations for Evaluating Potential Effects from Proposed Increases in Deposition to an FLM Area' section of the Deposition Chapter. The following steps summarize that process.

- From the respective Agency web sites, identify available on-site or representative wet and dry deposition data for the FLM area.
- Estimate the future deposition rate by adding the existing rate, the new emissions' contribution to deposition, and the contribution of sources permitted but not yet operating, while subtracting emission reductions that will occur before the proposed source begins operation. Modeling of new, reduced, and permitted but not yet operating emissions' contribution to deposition should be conducted following EPA recommendations.
- Compare the future deposition rate with the recommended screening criteria (e.g., critical load,



**Figure 3. FLM Assessment of Potential Deposition Effects from New Emissions Sources (Revised)**  
 \*Q/D test only applies to sources located greater than 50 km from a Class I area.

concern threshold, or screening level value) for the affected FLM area. A list of documents summarizing these screening criteria, where available, can be found in Appendix G.

- Information for USFS Class I areas is also available at: <http://www.fs.fed.us/air>

- NPS and FWS Class I area information is available at: <http://www.nature.nps.gov/air>

- Figure 3 shows the FLM review process to assess deposition impacts from new emission sources.

# 1. Background

## 1.1. History (Revised)

The Clean Air Act Amendments of 1977 give Federal Land Managers (FLMs) an “affirmative responsibility” to protect the natural and cultural resources of Class I areas from the adverse impacts of air pollution (see Appendix B: ‘Legal Framework for Managing Air Quality and Air Quality Effects on Federal Lands’). FLM responsibilities include the review of air quality permit applications from proposed new or modified major pollution sources near these Class I areas. If, in its permit review, an FLM demonstrates that emissions from a proposed source will cause or contribute to adverse impacts on the air quality related values (AQRVs) of a Class I area, the permitting authority, typically the State, can deny the permit.

The FLMs’ role in the reviewing of permit applications focuses on impacts to Class I areas.<sup>3</sup> Individually, FLMs have developed different approaches to identifying AQRVs and defining adverse impacts on AQRVs in Class I areas. For example, in 1988, the U.S. Department of Agriculture Forest Service (USFS) conducted a national screening process to identify the AQRVs for each of its Class I areas. Using this national process as a starting point, each USFS Region refined the screening parameters and identified sensitive AQRVs for many Class I areas. However, this resulted in differences in the approaches and levels used by USFS Regions. The U.S. Department of the Interior National Park Service (NPS) and the U.S. Fish and Wildlife Service (FWS) have adopted a case-by-case approach to permit review, considering the most recent information available for each area. NPS and FWS have included lists of sensitive AQRVs for their Class I areas in their Air Resources Information System (ARIS) database.

### 1.1.1. FLAG Approach (Revised)

Air resource managers from the USFS, NPS, and FWS recognized the need for a more consistent approach among their agencies with respect to their efforts to protect AQRVs. In April 1997, an interagency Work Group was formed whose objective was “to achieve greater consistency in the procedures each agency uses in identifying and evaluating AQRVs.” The Work Group named itself the

3. Nevertheless, the FLMs are also concerned about resources in Class II parks and wilderness areas because they have other mandates to protect those areas as well. The information and procedures outlined in this document are generally applicable to evaluating the effect of new or modified sources on the AQRVs in both Class I and Class II areas, including the evaluation of effects as part of Environmental Assessments and/or Environmental Impact Statements under the National Environmental Policy Act (NEPA). However, FLAG does not preclude more refined or regional analyses being performed under NEPA or other programs.



UL Bend National Wildlife Refuge, Montana.  
Credit: Maribeth Oaks/The Wilderness Society

Federal Land Managers’ Air Quality Related Values Work Group, or FLAG. Although FLAG membership comprises air resource managers and subject matter experts from the three agencies, representatives from the Bureau of Land Management, the U.S. Environmental Protection Agency (EPA), U.S. Geological Survey, and State air agencies have also participated in FLAG efforts.

FLAG participants have collaborated to:

- define sensitive AQRVs,
- identify the critical loads (or pollutant levels) that would protect an area and identify the criteria that define adverse impacts, and
- standardize the methods and procedures for conducting AQRV analyses.

To accomplish its objective, FLAG started with (and will continue to build on) the procedures, terms, definitions, and screening levels common to the three agencies. Many such “commonalities” were identified early in the FLAG planning sessions (see section 1.4, ‘Commonalities Among Federal Land Managers’).

FLAG’s “Action Plan” stipulates a phased approach. Phase I addressed issues that could be resolved without research or the collection of new data. When the Agencies embark on FLAG Phase II, they will address the more complex and unresolved issues from Phase I that may require additional data collection (see section 5, ‘Future FLAG Work’).

The FLAG effort focuses on the effects of the air pollutants that could affect the health of resources in Class I areas, primarily pollutants such as ozone, particulate matter, nitrogen dioxide, sulfur dioxide, nitrates, and sulfates. In Phase I, FLAG concentrated on four issues: (1) terrestrial effects of ozone; (2) aquatic and terrestrial effects of wet and dry pollutant deposition; (3) visibility impairment; and (4) process and policy issues. Four subgroups, one for each of

these issues, were formed and charged with developing a set of recommendations for consistent policies and processes.

FLAG 2000's findings and technical recommendations underwent scientific peer review, as well as review by agency decision-makers such as Class I area Park Superintendents, Refuge Managers, and Forest Supervisors; Regional Foresters; and the Assistant Secretary for Fish and Wildlife and Parks. (Note: USFS has designated the FLM as the Regional Foresters and, in some cases, Forest Supervisors.) FLAG products have also undergone public review and comment. A "notice of availability" of the draft FLAG 2000 report was published in the *Federal Register*, and the FLMs conducted a public meeting to discuss the draft FLAG report and provided a 90 day public comment period. For the FLAG 2010 revisions, the FLMs announced the availability of the draft report in the *Federal Register* and provided a 60 day public comment period. There was not sufficient public interest to conduct a public meeting to discuss the proposed revisions to the FLAG report.

### 1.1.2. FLAG Organization

In addition to the four subgroups (policy, deposition, ozone, and visibility), the FLAG organization included Leadership and Coordinating Committees and a Project Manager. The Leadership Committee, which includes the air quality program chiefs from the three FLM agencies, was responsible for providing direction to the Work Group and the resources necessary for FLAG to accomplish its objective. The Coordinating Committee, which also includes representatives from each agency, was responsible for communications within the Work Group, including coordination among the agencies and subgroups. The FLAG Project Manager coordinated FLAG activities, served as a single point-of-contact for the subgroups, and performed other administrative functions.

## 1.2. Overview of Resource Issues (Revised)

Research conducted on Federal lands by FLMs and others has characterized natural resource effects associated with air pollution, and has helped identify those particular resources that are vulnerable to pollution in different areas. This effort does not address the impacts from air pollution on cultural resources. Documented effects include impairment of visibility, injury and reduced growth of vegetation, and acidification and fertilization of soils and surface waters. Air pollution effects on resources have been identified in a number of FLM areas; a few examples are provided below. It is important to note that similar, or even more serious, air pollution effects may be occurring on all Federal lands, but FLMs have not had the financial resources to perform the inventorying, monitoring, and/or research necessary to document such effects. Furthermore, the sensitivity of resources may vary from area to area because the nature of

the resource, as well as geological, meteorological, biological, and other factors, vary from place to place.

### 1.2.1. Visibility

Visitors to national parks and wildernesses list the ability to view unobscured scenic vistas as a significant part of a satisfying experience. Unfortunately, visibility impairment has been documented in all Class I areas with visibility monitoring. Most visibility impairment is in the form of regional haze. The greatest visibility impairment due to regional haze occurs in the eastern United States and in southern California, while the least impairment occurs in the Colorado Plateau and Nevada Great Basin areas, and in Alaska. Ammonium sulfate contributes at least 50% to visibility impairment at most Class I areas in the eastern United States. The contribution to visibility impairment from ammonium nitrate is highest in central and southern California and in the Midwest. The largest region of high rural organic carbon visibility impairment is in the southeastern United States; impairment in this range is also present in the Sierra Nevada region of California and in the northern Rockies of Montana. The highest contribution to visibility impairment from fine soil is found in the arid Southwest. The highest coarse particle contribution to impairment is also in the arid Southwest and southern California. (DeBell et al. 2006) Visibility impairment on Federal lands can also result from plume intrusion and has been documented in Mount Zirkel Wilderness, Moosehorn National Wildlife Refuge, and Grand Canyon National Park.

### 1.2.2. Vegetation

While several components of air pollution (e.g., sulfur dioxide, nitrogen dioxide, and peroxyacyl nitrates) can affect vegetation, ozone is generally acknowledged as the air pollutant causing the greatest amount of injury and damage to vegetation. The most common visible effects are stipple (dark colored lesions on leaves resulting from pigmentation of injured cells), fleck (collapse of a few cells in isolated areas of the upper layers of the leaf, resulting in tiny light-colored lesions), mottle (degeneration of the chlorophyll in certain areas of the leaf giving the leaf a blotchy appearance), necrosis (death of tissue), and in extreme cases, mortality. Aside from visible injury, ozone exposure can result in less obvious physiological impairment such as decreased growth or altered carbon allocation.

Ozone fumigation experiments have identified a number of plant species that are sensitive to ozone. For example, fumigations were conducted in Great Smoky Mountains National Park (Tennessee and North Carolina) from 1987 to 1992. On the basis of foliar injury, thirty species were rated as sensitive to ozone levels that occurred in the park. The species with foliar injury included black cherry (*Prunus serotina*) and American sycamore (*Platanus occidentalis*). Additional observations and physiological measurements

indicated elevated ozone concentrations reduced leaf, root, and total dry weights, and increased the severity of leaf stipple and premature leaf abscission in these two species (Neufeld and Renfro 1993a,b). Field observations have documented foliar injury of these species in other eastern United States areas such as Brigantine Wilderness (New Jersey) and Cape Romain Wilderness (South Carolina).

Ponderosa pine (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) are recognized as good candidates for ozone-injury surveys in the western United States, based on their documented sensitivity. For example, these species were examined for ozone injury in national parks and national forests in the California Sierra Nevada from 1991 to 1995. The sites surveyed included Lassen Volcanic, Yosemite, and Sequoia/Kings Canyon National Parks and the Tahoe, Eldorado, Stanislaus, Sierra, and Sequoia National Forests. Foliar injury attributable to ozone was found at all areas, and the extent of injury generally increased in a southward direction along the Sierra Nevada (Miller 1995).

### 1.2.3. Soils and Surface Waters

Acidity in rain, snow, cloud water, and dry deposition can affect soil fertility and nutrient cycling processes in watersheds and can result in acidification of lakes and streams with low buffering capacity. Deposition of sulfate to sensitive watersheds results in leaching of base cations, soil acidification, and surface-water acidification. In some soils, sulfate adsorption results in “delayed” acidification of surface waters. Deposition of excess nitrogen species (nitrate and ammonium) to both terrestrial and aquatic systems can result in acidifying streams, lakes, and soils. There is also evidence that nitrogen deposition can cause shifts in phytoplankton composition in lakes in which biological activity is limited by nitrogen availability, i.e., increased nitrogen deposition can cause phytoplankton species that use nitrogen more efficiently to eventually dominate the lake.

Water chemistry surveys and on-going monitoring show that many high elevation lakes on Federal lands in the Sierra Nevada, Cascades, and Rocky Mountains are sensitive to acid deposition. In general, these lakes are on bedrock that provides them with very little buffering capacity. Some of these lakes, for example, Loch Vale in Rocky Mountain National Park (Colorado) experience episodic acidification during Spring snow melt (Baron and Campbell 1997).

Through funding provided by the Southern Appalachian Mountains Initiative, Herlihy et al. (1996) compiled information on surface water sensitivity of streams in nine of the eleven Class I areas in the Southern Appalachians. The nine Class I areas were grouped according to geology, physiography, and stream chemistry, then the groupings were ranked in terms of effects. Class I areas in the West Virginia Plateau (Otter Creek and Dolly Sods Wildernesses) had the highest percentage of acidic stream length and lowest

pH values. Class I areas in the Northern and Southern Blue Ridge (e.g., Shenandoah National Park in Virginia and Joyce Kilmer/Slickrock Wilderness in North Carolina) had a lower percentage of acidic stream length, however, streams with low buffering capacity were common. The Alabama Plateau Class I area (Sipsey Wilderness) had streams with the highest buffering capacity. (Note that the authors based their report on surveys conducted by others and did not account for potential differences in methods of data collection.)

A number of Federal areas contain estuarine and coastal areas that may experience eutrophication as a result of excess nitrogen deposition resulting from air pollution and other sources of nitrogen. For example, symptoms of eutrophication, including nutrient enrichment and algal blooms, have been observed in Everglades National Park and Chassahowitzka Wilderness (Florida).

### 1.3. Legal Responsibilities (Revised)

The specific legal responsibilities that Congress has given FLMs to protect natural, cultural, and scenic resources on the public lands from air pollution are identified in Appendix B. Statutes described in Appendix B include agency organic acts, the Wilderness Act, and the Clean Air Act (CAA).

The fundamental Congressional direction for managing public lands arises out of respective organic acts. Each of these laws is essentially a charter from Congress to the Executive Branch providing a purpose for parks, wildernesses, and refuges, respectively, and establishing broad management objectives for these areas. The Wilderness Act sets aside a subset of these public lands where natural processes are allowed to dominate. The agency stewards develop specific management objectives building on the organic acts using public involvement, regulations, best available science, and additional direction provided by Congress.

Among this additional Congressional direction is the Clean Air Act (CAA). It further characterizes some of the public lands as “Class I” areas and bestows on the land managers an affirmative responsibility to protect these areas from air pollution. The CAA directs that the FLMs identify and protect air quality related values, including visibility. This direction is consistent with the underlying charters provided by the organic acts and the Wilderness Act. The similarities of management objectives, and of the policies and procedures necessary for protecting Class I areas, are at the core of the FLAG process. Please note that although all wilderness is not Class I, and the FLMs have not proposed that non-Class I wilderness be classified as Class I, management actions (e.g., limiting human activities) that satisfy wilderness management objectives for Class II areas, are often substantially the same as those used in Class I area management.

In implementing laws, it is essential to understand the intent of Congress. In the case of the CAA, the FLM gleaned additional insight from a passage in Senate Report No. 95-127, 95<sup>th</sup> Congress, 1st Session, 1977 which states:

The Federal Land Manager holds a powerful tool. He is required to protect Federal lands from deterioration of an established value, even when Class I [increments] are not exceeded. . . . While the general scope of the Federal Government's activities in preventing significant deterioration has been carefully limited, the FLM should assume an aggressive role in protecting the air quality values of land areas under their jurisdiction. In cases of doubt the land manager should err on the side of protecting the air quality-related values for future generations.

Although the FLMs have an "affirmative responsibility" to protect AQRVs, they have no permitting authority under the CAA, and they have no authority under the CAA to establish air quality-related rules or standards. The FLM role within the regulatory context consists of considering whether emissions from a new source, or emission increases from a modified source, may have an adverse impact on AQRVs and providing comments to permitting authorities (States or EPA). It is important to emphasize that the FLAG report only explains factors and information the FLMs expect to use when carrying out their consultative role. It is not a rule or standard.

The FLAG report describes the steps and process that the FLMs intend to go through in order to perform their statutory duties. Consequently, the scope of the FLAG report is to provide a more consistent approach for the three FLM agencies to evaluate air pollution effects on resources, and to provide guidance to permitting authorities and permit applicants regarding necessary AQRV analyses. Although FLAG strives to be consistent with regulatory programs and initiatives such as the Regional Haze Rule and New Source Review Reform, no direct ties exist between FLAG and these regulatory requirements.

#### 1.4. Commonalities Among Federal Land Managers

If a new source is proposed near two or more areas managed by different FLMs, the FLMs generally try to coordinate in their interactions with the permitting authority and with the applicant. For example, two or more FLMs involved in pre-application meetings typically try to minimize the workload for the applicant by reaching agreement on the types of analyses the application should contain. Beyond coordinating during permit review, FLMs currently base requests and decisions on similar principles regarding resource protection and FLM responsibilities. Listed below are the common principles in five areas of air resource management. In addition, Appendix C provides the FLM's

'General Policy for Managing Air Quality Related Values in Class I Areas.'

##### 1.4.1. Identifying AQRVs (Revised)

FLMs agree on the following definition of an AQRV:

A resource, as identified by the FLM for one or more **Federal areas that may be adversely affected by a change in air quality.** The resource may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource identified by the FLM for a particular area.

This definition is compatible with the general definition of AQRV that appears in the *Federal Register* (45 FR 43003, June 25, 1980). That definition includes visibility, flora, fauna, odor, water, soils, geologic features, and cultural resources. FLMs have the responsibility to identify specific AQRVs of areas they manage. To this end, FLMs further refine AQRVs beyond the above definition to be more site-specific (i.e., area specific) by using on-site information. To the extent possible, the FLMs have identified specific AQRVs for many Class I areas. Site-specific AQRV lists are available on the respective Agency web sites, or by contacting the Agencies directly. The FLMs also recognize that, ideally, inventories should be developed for all Class I areas. The FLMs may identify additional AQRVs in the future as more is learned through science about the sensitivity of resources to air pollution. A public process involving the regulated community and other interested members of the public is necessary and will be accomplished through participation in the land management planning process or reply to an announcement in the *Federal Register*. Finally, FLMs agree on the need for continued inventory, research, and monitoring to improve their ability to determine which AQRVs are most sensitive to air pollution and the sensitivity of these AQRVs.

##### 1.4.2. Determining the Levels of Pollution that Trigger Concern for the Well-Being of AQRVs (Revised)

FLMs acknowledge the importance of being able to agree among themselves on the levels of pollution that trigger concerns for AQRVs. FLMs recognize the need to assess cumulative impacts and the difficulties associated with this process. Difficulties arise when a large number of minor source impacts eventually lead to an unacceptable cumulative impact or when a new source applies for a PSD permit in an area that has a high background concentration of pollution from existing sources. The agencies will evaluate a proposed new source within the context of the total impacts that are occurring or that potentially could occur from permitted/existing sources on the AQRVs of the area and should consider the effects of both emission increases and decreases.

### 1.4.3. Visibility

FLMs use EPA-approved models [Appendix W of Part 51 (EPA's *Guideline on Air Quality Models*, revised November 2005), as required under the PSD regulations at 40 CFR 51.166(1) and 52.21(1)] and the recommendations of the Interagency Work Group on Air Quality Modeling (IWAQM) to evaluate visibility impacts. The models use thresholds of visibility degradation measured in light extinction to evaluate source impacts to haze (far-field/multi-source impacts), and EPA established criteria for coherent plume impacts (near-field impacts). Currently all FLMs use Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data to determine current conditions for visibility in FLM areas.

### 1.4.4. Biological and Physical Effects

All FLMs rely on research, monitoring, models, and effects experts to identify and understand physical, biological, and chemical changes resulting from air pollution and relating them to changes in AQRVs. Further, they focus on sensitive AQRVs (defined as either species or processes) to assess this biological/physical/chemical change.

### 1.4.5. Determining Pollution Levels of Concern (Revised)

FLMs rely on the best scientific information available in the published literature and best available data to make informed decisions regarding levels of pollution likely to cause adverse impacts. FLMs re-evaluate, update, and assess this information as appropriate. They consider specific Agency and Class I area legislative mandates in their decisions and, in cases of doubt, "err on the side of protecting the AQRVs for future generations." (Senate Report No. 95-127, 95<sup>th</sup> Congress, 1st Session, 1977)

For air quality dispersion modeling analyses, FLMs follow Appendix W of Part 51 (EPA's *Guideline on Air Quality Models*, revised November 2005), as required under the PSD regulations at 40 CFR 51.166(1) and 52.21(1), and the recommendations of the Interagency Work Group on Air Quality Modeling (IWAQM). FLMs recommend protocols for modeling analyses to permit applicants on a case-by-case basis considering types and amount of emissions, location of source, and meteorology. When reviewing modeling and impact analysis results, all FLMs consider frequency, magnitude, duration, location of impacts, and other factors, in determining whether impacts are adverse.

### 1.4.6. FLM Databases (Revised)

*Air Resources Information System (ARIS) (Formerly Air Synthesis) (Revised)*

ARIS provides information on air quality related values in NPS and FWS Class I areas, as well as in many NPS Class II areas. ARIS identifies specific AQRVs, and provides

information on air quality and its effects in parks and wildernesses.

*Natural Resource Information System – Air Module (NRIS-AIR) (Revised)*

Publicly available USDA Forest Service Class I and II area information and related resource data can be linked to or found at <http://www.fs.fed.us/air>. If desired information and data cannot be found, contact any air program manager or specialist at national or regional offices for assistance.

## 1.5. Regulatory Developments Since FLAG 2000 (New)

Several regulatory developments have occurred since the FLMs published the FLAG report in December 2000. Some of these regulatory developments may have a significant effect on air resource management in mandatory Class I areas, or how these effects are assessed. First, on April 15, 2003, the Environmental Protection Agency (EPA) promulgated revisions to Appendix W of 40 C.F.R. §51 (*Guideline on Air Quality Models*). EPA revised the Guideline to adopt the CALPUFF model as a preferred long-range transport model for inclusion in Appendix A of that document. Prior to that date, FLAG 2000 relied on CALPUFF as the suggested model of choice for long-range transport assessments in accordance with recommendations of the Interagency Work Group on Air Quality Models (IWAQM). EPA's adoption of CALPUFF substantiates the Agencies' model choice. In addition, EPA's action, combined with improved computer technology, has resulted in the availability of more meteorological data. These improvements have enhanced the ability of permitting authorities and applicants to perform the types of modeling analyses suggested in FLAG. However, the FLMs will continue to work with the EPA on recommendations for future long-range transport model development.

On May 12, 2005, the EPA published the Clean Air Interstate Rule (CAIR) to reduce interstate transport of fine particulate matter and ozone. The CAIR applied to 28 eastern states and the District of Columbia, and required those areas to significantly reduce emissions of sulfur dioxide (SO<sub>2</sub>) and/or nitrogen oxides (NO<sub>x</sub>) from utilities. Although EPA developed the CAIR to address violations of the National Ambient Air Quality Standards (NAAQS) for fine particulates (PM<sub>2.5</sub>) and ozone, the associated SO<sub>2</sub> and NO<sub>x</sub> emission reductions would also benefit visibility and other AQRVs at many eastern Class I areas. The Agencies supported the CAIR, however, because it did not apply to western states, the majority of the Class I areas would not have directly benefited from the rule. Please note that at the time of this writing CAIR has been remanded to the EPA for revision to address various court challenges, and EPA has proposed a new transport rule as a replacement (EPA 2010a).



On July 6, 2005, the EPA published a final rule and associated guidelines that detail the Best Available Retrofit Technology (BART) requirements of the Regional Haze Rule. Among other things, the BART guidelines advise States to rely on the CALPUFF model for long-range visibility impairment assessments, provide thresholds for what constitutes causing or contributing to regional haze visibility impairment, and includes screening level values that exempt certain sources from further analysis. As discussed in more detail below, the Agencies believe the assumptions and methodology included in the BART guidelines also have merit with respect to evaluating haze-like visibility impairment for New Source Review under the PSD and other programs. Consequently, the Agencies are paralleling some of those BART guidelines in this FLAG revision.

Please note that FLAG 2000 acknowledges the EPA's July 1999 Regional Haze Rule, and discusses possible changes to FLAG that may be necessary as States implement the Regional Haze Rule. Although the EPA promulgated the

Regional Haze Rule before the FLMs published FLAG 2000, there were several improvements and differences in the associated EPA guidance documents (e.g., those related to Natural Conditions and Tracking Progress) that were not finalized until December 2003. Therefore, these documents were not reflected in FLAG 2000, but have been considered in this revision. Currently, State Implementation Plans (SIPs) under the Regional Haze Rule are being developed, and submitted to the EPA for approval. If the new visibility SIPs adequately account for new source growth, the Agencies may need to make further revisions to the FLAG recommendations to reflect progress made through the SIP process that could minimize the focus the FLMs place on individual sources.

EPA has also developed other regulations, standards, and policies that will help reduce air pollution and resulting impacts at FLM areas (e.g., revised ozone, sulfur dioxide, nitrogen dioxide, and particulate matter standards; mobile source controls).

## 2. Federal Land Managers' Approach to AQRV Protection

FLM responsibilities for resource protection on Federal lands are clear and there should be no misunderstanding regarding the tools the FLM uses to fulfill these responsibilities. Opportunities to influence decisions regarding pollution sources external to the park or wilderness are limited. However, FLMs strive to minimize emissions from internal sources and their effects. Approaches for minimizing air pollution from external and internal sources are discussed in detail below.

### 2.1. AQRV Protection and Identification (Revised)

Congress assigned the FLMs an affirmative responsibility to protect AQRVs in Federal Class I areas. The FLMs interpret this assignment as a responsibility to:

- Identify AQRVs in each of the Class I areas.
- Establish inventoring and monitoring protocols for AQRVs.
- Prioritize AQRV inventoring and monitoring.
- Specify a process for evaluating air pollution effects on AQRVs, including the use of sensitive indicators.
- Specify adverse effects for each AQRV.

To the extent possible, AQRVs have been identified for each Class I area. As noted above, the FLMs may identify additional AQRVs in the future as more is learned about the sensitivity of resources to air pollution. The FLMs will provide a public process involving the regulated community and other interested members of the public in order to seek public input regarding AQRV-identification issues. This desired public involvement will be accomplished through participation in the land management planning process or reply to an announcement in the *Federal Register*.

While the sensitivity of an AQRV to air pollution may be known, long-term monitoring of the health or status of the AQRV may not have been accomplished. The expense of monitoring all AQRVs simultaneously is prohibitive. Consequently, FLMs seek opportunities through the permitting process and through partnerships to gather more information about condition of AQRVs.

Because AQRVs themselves are often difficult to measure, surrogates are used as indicators, or sensitive indicators, of the health or status of the AQRV. A working process for Class I area management and AQRV protection is outlined ahead in this document.

An adverse impact is determined for each AQRV. An adverse impact from air pollution results in a diminishment of



Sipsey Wilderness, Alabama.  
Credit: Steve Boutcher

the Class I area's national significance, that is, the reason the Class I area was created. Adverse impacts can also be an impairment of the structure or functioning of the ecosystem, as well as an impairment of the quality of the visitor experience. The FLMs make an adverse impact determination on a case-by-case basis, based on technical and other information, which is then conveyed to the permitting authority.<sup>4</sup> The permitting authority then considers this, along with other factors, in its determination regarding the permit application.

### 2.2. New Source Review (Revised)

Section 165 of the CAA spells out the roles and responsibilities for FLMs in New Source Review, including the Prevention of Significant Deterioration (PSD) permitting program. Other laws, such as the respective agency organic acts and the Wilderness Act, provide the fundamental underpinning of land management direction to land managers. The following discussion merges this complex labyrinth of legal responsibilities as it relates to air resource management.

#### 2.2.1. Roles and Responsibilities of FLMs (Revised)

The federal officials directly responsible for the national parks, national wildlife refuges, and national forests (e.g., park superintendents, refuge managers, and forest supervisors, respectively) derive their responsibility from the respective agency organic acts. Furthermore, these officials, and the FLM for the respective agencies, have an affirmative responsibility under Section 165 of the CAA to protect and

4. As discussed elsewhere in this report, if a proposed source's impacts on AQRVs exceed established significance criteria, the FLMs will consider the magnitude, frequency, geographic extent, etc. of the impacts, and other relevant factors, in determining whether or not the impacts are adverse.

enhance the AQRVs of Class I areas from the adverse effects of air pollution. The FLM for the USFS is the Regional Forester or the Forest Supervisor depending on the specific location. The FLM for the NPS and FWS is the Department of the Interior's Assistant Secretary for Fish and Wildlife and Parks.

The FLMs have visibility protection responsibility under 40 CFR §51.307 (New source review), which spells out the requirements for State Implementation Plan (SIP) visibility protection programs, as well as 40 CFR §52.27 (Protection of visibility from sources in attainment areas) and 40 CFR §52.28 (Protection of visibility from sources in non-attainment areas). These three provisions, taken together along with the SIP-approved rules, establish the visibility protection program for new and modified sources throughout the country.

### *Notification*

Section 165 (42 USC 7475) of the CAA requires the EPA, or the State/local permitting authority, to notify the FLM if emissions from a proposed project may impact a Class I area. The permitting authority should forward PSD applications to the FLM for review and analysis as soon as possible after receipt, giving the FLM an opportunity to review the application concurrently with the permitting authority.

Generally, the permitting authority should notify the FLM of all new or modified major facilities proposing to locate within 100 km (62 miles) of a Class I area. In addition, the permitting authority should notify the FLM of "very large sources" with the potential to affect Class I areas proposing to locate at distances greater than 100 km. (Reference March 19, 1979, memorandum from EPA Assistant Administrator for Air, Noise, and Radiation to Regional Administrators, Regions I - X). Given the multitude of possible size/distance combinations, the FLMs can not precisely define in advance what constitutes a "very large source" located more than 100 km away that may impact a particular Class I area. However, as discussed elsewhere in this report, the Agencies have adopted a size (Q)/distance (D) criteria to screen out from AQRV review those sources with relatively small amounts of emissions located a large distance from a Class I area. Consequently, as a minimum, the permitting authority should notify the FLM of all sources that exceed this Q/D criteria. Nevertheless, the FLM and permitting authority should still work together to determine which other PSD applications the FLM is to be made aware of in excess of 100 km. In making this determination, the FLM and permitting authority should consider, on a case-by-case basis, such factors as:

- Current conditions of sensitive AQRVs;
- Magnitude of emissions;
- Distance from the Class I area;
- Potential for source growth in an area/region;

- Existing/prevaling meteorological conditions;
- Cumulative effects of several sources to AQRVs, as well as changes in their emissions.

Additionally, such dialogue facilitates coordination between permitting authorities and the FLMs. The significance of the impact to AQRVs is more important than the distance of the source. Not all PSD permit applications that the FLM is notified of will be analyzed in-depth by the FLM. FLM notification of a PSD permit application for a project located greater than 100 km does not mean that the permit application will be reviewed by the FLM in detail. Notification of PSD permit applications in excess of 100 km by the permitting authority allows the FLM to gauge the level of potential cumulative effects. As indicated above, the FLM decides which PSD permit applications to review on a case-by-case basis depending on the potential impacts to AQRVs.

### *Pre-Application Meetings*

To expedite the PSD permit review process, the FLM encourages pre-application meetings with permitting authorities and permit applicants to discuss air quality concerns for a specific Class I area in question. Given preliminary information, such as the source's location and the types and quantity of projected air emissions, the FLM can discuss specific AQRVs for an area and advise the applicant of the analyses needed to assess potential impacts on these resources.

### *Completeness Determination*

To further minimize delays, the FLMs encourage the permitting authority to use comments provided by the FLM concerning the completeness of the application, and to not deem the application complete until the applicant performs all necessary air quality impact analyses, including all relevant AQRV impact information. The permitting authority should then notify the FLM when they deem the application to be complete.

### *Visibility Protection Procedures*

Additional procedural requirements apply when a proposed source has the potential to impair visibility in a Class I area (40 CFR §52.27(d)(2007); 40 CFR §51.307(a)(2007)). Specifically, the permitting authority must, upon receiving a permit application for a source that may affect visibility in any Class I area, notify the FLM in writing. Such notification shall include a copy of all information relevant to the permit application, including the proposed source's anticipated impacts on visibility in a Class I area. The permitting authority shall notify the FLM within 30 days of receipt and at least 60 days prior to the close of the comment period.

If the FLM notifies the permitting authority that the proposed source may adversely impact visibility in a Class I area, or may adversely impact visibility in a previously identified integral (scenic) vista, then the permitting

authority is to work with the FLM to address their concerns. If the permitting authority agrees with the FLM's finding that visibility in a Class I area may be adversely affected, the permit may not be issued. Even though the permitting authority may agree with the FLM's adverse impact finding regarding integral vistas, the permitting authority may still issue a permit if the emissions from the source are consistent with reasonable progress toward the national goal of preventing or remedying visibility impairment. In making this decision, the permitting authority may take into account the costs of compliance, the time needed for compliance, the energy and non-air quality environmental impacts of compliance, and the useful life of the source.

The FLM will make a preliminary determination regarding possible adverse visibility impacts upon receipt of all relevant information, including the draft permit and any associated staff analysis.

### 2.2.2. Elements of Permit Review

The FLM review of a PSD application for a proposed project that may impact a Class I area generally consists of three main analyses:

1. Air quality impact analysis to ensure that predicted pollutant levels in Class I areas do not exceed National Ambient Air Quality Standards (NAAQS) and PSD increments, and to provide sufficient information for the FLM to conduct an AQRV impact analysis. Ensuring that permit applicants meet these requirements is the direct responsibility of the permitting authority (see discussion below);
2. AQRV impact analysis to ensure that the Class I area resources (i.e., visibility, flora, fauna, etc.) are not adversely affected by the proposed emissions. The AQRV impact analysis includes interpreting the significance of the results from the applicant's air quality impact analysis and is the responsibility of the FLM (see discussion below); and
3. Best Available Control Technology (BACT) analysis to help ensure that the source installs the best control technology to minimize emission increases from the proposed project (See Appendix D for a summary of this analysis). The final BACT determination is a direct responsibility of the permitting authority.

#### *Air Quality Impact Analysis*

The permit applicant must perform an air quality impact analysis for each pollutant subject to PSD review (40 CFR §51.166). This analysis must show the contribution of the proposed emissions to increment consumption and to the existing ambient pollution levels in a Class I park or wilderness area. The applicant must perform a cumulative increment analysis for each pollutant and averaging time for which the proposed source will have a significant impact.

Because proposed sources are not yet operating, the air quality analysis should rely on mathematical dispersion models to estimate the air quality impact of the proposed emissions. The FLMs provide the applicants with guidance on where to place model receptors within the Class I area. The applicant is responsible to provide sufficient information for the FLM to make a decision about the acceptability of potential AQRV impacts as a consequence of the new source.

The applicant must perform the air quality impact analysis using approved models and procedures as specified in Appendix W of Part 51 (EPA's *Guideline on Air Quality Models*, revised November 2005), as required under the PSD regulations at 40 CFR 51.166(1) and 52.21(1). The applicant should explicitly state all assumptions for the analysis, and furnish sufficient information on modeling input so that the FLM can validate and duplicate the model results. FLMs encourage the permit applicant to submit a modeling protocol for review before performing the Class I modeling analyses. This protocol should include the proposed air quality analysis methodology and model input (i.e., emissions, stack data, meteorological data, etc.), and the proposed location of the receptors in the FLM area.

#### *AQRV Impact Analysis*

According to the CAA's legislative history and current EPA regulations and guidance, the air quality impact analysis that provides sufficient information to enable the FLM to conduct the AQRV impact analysis is one part of a permit application just as are the BACT analysis and the air quality impact analysis relative to the increments and NAAQS. The applicant bears the entire cost of preparing the permit application including the complete air quality impact analysis.

It is important to highlight the distinction between the air quality impact analyses that the applicant performs and the AQRV impact analyses that FLMs perform. Whereas the permit applicant calculates changes in pollutant concentrations, deposition rates, or visibility extinction, the FLM assesses the extent to which these impacts affect sensitive visual, aquatic, or terrestrial resources. Given the FLM's statutory responsibilities and expertise, the FLM must have responsibility to consider whether the amount of pollution dispersed into the air or deposited on the ground (or in water) would have an adverse impact on any AQRV, and if so, to demonstrate that claim to the permitting authority. In making an adverse impact finding, FLMs consider such factors as magnitude, frequency, duration, location, geographic extent, and timing of impacts, as well as current and projected conditions of AQRVs based on cumulative impacts.

The FLM uses the results from the applicant's air quality impact analysis and other information to conduct the

AQRV impact analysis and make an informed decision about whether or not AQRVs will be adversely affected. If the FLM concludes that AQRVs will be adversely affected, the FLM will so demonstrate to the permitting authority. The following sections of this document give guidance to applicants on how to conduct an air quality impact analysis and how the FLM uses this information to make an AQRV impact decision.

#### *Cumulative Impact Analysis*

The FLM will evaluate on a case-by-case basis both the permit applicant's contribution to the AQRV impacts, as well as the cumulative source impacts on AQRVs, taking into account expected emission reductions. A cumulative air quality analysis in which the proposed source and any recently permitted (but not yet operating) sources in the area are modeled is an important part of any AQRV impact analysis. This cumulative modeled impact is then added to measured ambient levels (to the extent that such monitoring data are available) so that the FLM can assess the total effect of the anticipated ambient concentrations on AQRVs. If no representative monitoring data are available, the total pollutant concentrations should be estimated by modeling emissions from all contributing sources in the area.

#### *Information Provided by the FLM to the Applicant*

To assist the permit applicant in performing air quality impact analyses, the FLMs will provide all available information about AQRVs for a particular Class I area that may be adversely affected by emissions from the proposed source. FLMs will recommend available methods the applicant should use to analyze the potential effects (i.e., pollutant concentration, deposition rates, and visibility extinction) in the Class I area. In addition to identifying AQRVs, FLMs will, to the extent possible:

- identify inventories, surveys, monitoring data, scientific studies, or other published reports that are the basis for identification of AQRVs;
- identify specific receptors known to be most sensitive to air pollution and the pollutant or pollutants that individually or in combination can cause or contribute to an adverse effect on each receptor;
- identify the critical pollutant concentrations above which adverse effects are known or suspected to occur;
- recommend methods the applicant should use for predicting ambient pollutant concentrations and other related impacts (e.g., deposition, visibility) which may cause or contribute to an adverse effect on each receptor; and
- suggest screening level values or criteria that would be used to assess whether a proposed emissions increase would have a *de minimis* impact on AQRVs.

### 2.2.3. FLM Permit Review Process

The FLM's current permit review process for any application that may impact a FLM area is described below.

1. **Pre-application.** If possible, participate in any pre-application meeting to learn specifics of the proposed project (size, emissions, location, etc.) and to provide information regarding recommended Class I analyses.
2. **Modeling Protocol.** The FLMs encourage the permit applicant to submit a modeling protocol for review before performing the Class I modeling analyses. This protocol should include the proposed air quality analysis methodology and model input (i.e., emissions, stack data, meteorological data, etc.), and the proposed location of the receptors in the FLM area.
3. **Completeness Determination.** Upon receipt, the FLM will review the application and provide comments to the permitting authority regarding the completeness of the application and the need for additional information regarding the BACT, Air Quality Impacts, and AQRV Impacts analyses. The FLM will coordinate with the permitting authority and the permit applicant to ensure that all the necessary information to enable the FLM to make an impact determination is included.
4. **Public Comment Period.** After review of all relevant information, the FLM will provide pertinent comments to the permitting authority, before or during the official public comment period, and/or at scheduled public hearings.
5. **No Class I Increment Violated and No Adverse Impacts.** If no Class I increment is violated and no adverse impacts to AQRVs are expected, the FLM will inform the permitting authority of this determination and no further FLM action is necessary. The FLM may still provide BACT comments.
6. **No Class I Increment Violated but AQRV Impacts Uncertain.** If no Class I increment is violated but uncertainty exists regarding potential adverse impacts to AQRVs, the FLM may request that the permitting authority include a permit condition that requires the permittee to conduct relevant post-construction AQRV or air quality monitoring. The FLM may also request certain control technologies or methods to reduce impacts.
7. **Class I Increment Violated, but No Adverse AQRV Impacts.** If the Class I increment is violated, but no adverse AQRV impacts are anticipated, the applicant requests the FLM to "certify" no adverse impact under Section 165(d)(2)(C)(iii) of the Clean Air Act [42 USC 7475(d)(2)(C)(iii)(1998)]. If the FLM concurs, (s)he makes a preliminary determination that no adverse impacts will occur.

- The FLM will inform the applicant, the State/local permitting authority, and EPA of the preliminary no adverse impact determination.
- The FLM will notify the public of its preliminary no adverse impact determination either through the permitting authority's notice procedures, or through separate notice in the *Federal Register*. Such notice should include a statement as to the availability of supporting documentation for inspection and copying, and an announcement of at least a 30 day public comment period on issues directly relevant to the determination in question.
- The FLM will review and prepare response to public comments.
- The FLM will make a final determination regarding no adverse impacts, with a clear and concise statement of reasons supporting that determination.
- The FLM will inform the permit applicant, the permitting authority, and EPA of its final determination and if the final determination is "no adverse impact," the FLM shall so "certify" in a letter to the affected parties.
- Simultaneous with above, the FLM will publish a final determination in the 'Notice' section of the *Federal Register*, including a clear and concise statement of reasons supporting that determination, statement as to availability of supporting documentation for inspection and copying, and statement as to immediate effective date (date signed) of final determination.
- The FLM will contact the permitting authority and request a revision to the State Implementation Plan (SIP) to eliminate the Class I increment violations.

8. **Adverse Impact Determination.** Regardless of increment status, the FLM may make a preliminary determination that the proposed project will cause, or contribute to, an adverse impact on AQRVs. Before officially declaring an adverse impact, the FLM will inform the proposed new source and the permitting authority that an adverse impact determination is imminent and suggest that the draft permit be modified. If the draft permit is modified to satisfy the concerns of the FLM, then an adverse determination is avoided.

- The FLM will inform the applicant, the permitting authority, and EPA of a preliminary adverse impact determination.
- The FLM will notify the public of the preliminary adverse impact determination either through the permitting authority's notice procedures, or through separate notice in the *Federal Register*. Such notice should include a statement as to the availability of supporting documentation for inspection and

- copying, and an announcement of at least a 30 day public comment period on issues directly relevant to the determination in question.
- The FLM will review and prepare response to public comments.
- The FLM will make a final determination regarding adverse impacts, with a clear and concise statement of reasons supporting that determination.
- The FLM will inform the permit applicant, the permitting authority, and EPA of its final determination.
- Simultaneous with above, the FLM will publish a final determination in the 'Notice' section of the *Federal Register*, including a clear and concise statement of reasons supporting that determination, statement as to availability of supporting documentation for inspection and copying, and statement as to immediate effective date (date signed) of final determination.
- If the FLM makes a final determination that a source will have an adverse impact, the FLM will oppose the permit. However, the permit applicant may propose to mitigate any adverse impacts (via reducing emissions, obtaining emission offsets, etc.). If the applicant adequately mitigates the adverse impacts to the satisfaction of the FLM, the FLM will withdraw his objection to the permit. If the adverse impacts are not adequately mitigated and the permitting authority nevertheless issues the permit, the FLM may appeal the permit.

Note: If the permitting authority's SIP makes execution of the above listed steps impossible (e.g., inadequate time allotments for the FLM's determination or lack of timely FLM notice) the procedures shall be adjusted as appropriate. In addition, the above procedures (6 and 7) could also be modified to accommodate those situations when the FLM chooses to certify that existing impacts are adverse, absent a proposed new source. Such an action would alert potential permit applicants that adverse impacts exist and any new source would need to mitigate its potential impacts. Although each FLM may implement the above procedures somewhat differently, the FLAG goal is to reduce the differences in implementing the above steps.

Furthermore, FLMs intend to coordinate on air permit modeling requirements for new or modified sources that are geographically near more than one FLM area. For example, a proposed source in eastern Tennessee that lies equidistant from NPS-administered Great Smoky Mountains National Park and the FS-administered Joyce Kilmer/Slickrock Wilderness would receive coordinated guidance on modeling requirements from the FLMs. The FLMs may or may not have common AQRVs at different Class I areas, making coordination beneficial. The FLMs may also

coordinate on potential permit conditions and mitigation strategies.

#### 2.2.4. Criteria for Decision Making (Adverse Impact Considerations) (Revised)

As previously mentioned, the legislative history of the CAA provides direction to the FLM on how to comply with the **affirmative responsibility to protect AQRVs in Class I areas, and in cases of doubt, the land manager should err on the side of protecting air quality-related values for future generations.**

The FLMs define adverse impact on AQRVs as:

**An unacceptable effect, as identified by an FLM that results from current, or would result from predicted, deterioration of air quality in a Federal Class I or Class II area. A determination of unacceptable effect shall be made on a case-by-case basis for each area taking into account existing air quality conditions. It should be based on a demonstration that the current or predicted deterioration of air quality will cause or contribute to a diminishment of the area's national significance, impairment of the structure and functioning of the area's ecosystem, or impairment of the quality of the visitor experience in the area.**

Also, the Federal visibility protection regulations (40 CFR §1.300, et seq., §52.27) define adverse impact on visibility as:

[V]isibility impairment which interferes with the management, protection, preservation or enjoyment of the visitor's visual experience of the Federal class I area. This determination must be made on a case-by-case basis taking into account the geographic extent, intensity, duration, frequency, and time of visibility impairment, and how these factors correlate with: (1) times of visitor use of the Federal class I area, and (2) the frequency and timing of natural conditions that reduce visibility. (Id. §1.301(a))

FLMs typically address adverse impacts on a case-by-case basis in response to PSD permit applications. The factors the FLMs will consider in making an adverse impact determination are discussed in more detail below (see section 4.3). When an adverse impact is predicted, FLMs recommend that permits either be modified to protect AQRVs or be denied. FLMs can also address adverse conditions outside of the PSD process. They do so through a variety of mechanisms: certify visibility impairment; participate in regional assessments; informally collaborate with States and EPA; review lease permits, SIP revisions, National Environmental Policy Act (NEPA) analyses, Park/Refuge/Forest management plans, CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) reviews, and other documents.

In some States, FLMs use screening procedures or thresholds that indicate when the condition of an AQRV is acceptable or unacceptable. The pollutant concentration or loading rate that will adversely impact an AQRV can vary among Class I areas, and depends on current conditions. After a threshold is reached, an increase in pollutant concentrations is likely to be unacceptable. A concern threshold can be an adverse impact threshold or other quantifiable level in resource condition or pollutant exposure identified by the FLM.

#### 2.2.5. Air Pollution Permit Conditions that Benefit Class I Areas

The FLM does not determine what permit conditions will be required or administer permit conditions; that is the responsibility of the permitting authority. However, the FLMs may request permit conditions or agree to withdraw objections to permit issuance if requested conditions are included. The FLMs view the inclusion of certain PSD permit conditions by the permitting authority as a means to help protect or enhance the condition of AQRVs when:

1. Air pollution source(s) may cause impacts that exceed protection thresholds for AQRVs;
2. Terrestrial resources, aquatic resources, and/or visibility are currently adversely impacted by air pollution and proposed emissions will exacerbate these adverse conditions;
3. FLM policies require improvement or restoration of AQRVs in parks and wildernesses; and
4. There is uncertainty on the extent and magnitude of air pollution effects on AQRVs.

Recommended permit conditions may include requiring **emission offsets, AQRV and/or air quality monitoring, inventories, post-construction reassessment, LAER (or other improved control technologies), or other measures to protect, enhance, or restore resources and values of parks and wildernesses.** Permit conditions may:

1. Result in net air quality benefits at a protected area or within a region;
2. Contribute to a reduction of air pollution within a region;
3. Promote ecosystem inventories and/or monitoring to evaluate physical and biological resource damage caused by air pollution emissions; and
4. Promote ecosystem restoration or improve the condition of resources that have been damaged by air pollution emissions.

The basis of an air permit condition should be identified in the public notice for the draft permit. To be effective, permit conditions must be federally enforceable and guaranteed. Air permit provisions may be temporary or permanent depending on the nature of the permit requirements.

Procedures to implement an air permit condition must be acceptable to the FLM (e.g., an agreement between parties [memorandum of understanding, interagency agreement] is an option to accomplish inventory, monitoring, or other requirements).

### 2.2.6. Reducing Pollution in Nonattainment Areas (Nonattainment Permit Process)

The PSD program does not apply with respect to a particular pollutant when the source locates in an area designated non-attainment for that pollutant. Instead, pollution sources are regulated by Non-attainment Area New Source Review (NNSR). NNSR includes air quality planning and regulation of stationary sources. Air quality planning addresses issues such as lowest achievable emission rate (LAER), offsets, reasonably available control technology (RACT), and mobile and stationary source control strategies. New major stationary sources and major modifications of sources in designated non-attainment areas must satisfy NNSR before construction begins. For visibility protection, SIPs must include either EPA-approved provisions to comply with 40 CFR §51.307 for the non-attainment pollutant, otherwise, the federally promulgated visibility provisions at 40 CFR §52.28 would apply to all sources located in non-attainment areas. Therefore, FLMs can provide suggestions to the permitting authority regarding these conditions during the permitting and planning processes.

SIPs provide a mechanism to address AQRV impacts when the source or the Class I area is located in a non-attainment area. FLMs may recommend that States adopt policies, rules, or regulations in their SIPs requiring a demonstration that offsets will result in a net air quality benefit within any Class I area likely to be impacted by emissions from the source to be permitted. FLMs may also request emissions reductions greater than 1:1, perhaps offset rates of 1.5 or 2.0 to 1, or higher, depending on the nature and magnitude of impacts to be offset. Such recommendations can be developed jointly in a meeting with the regulatory authority or in a letter from the FLM.

Mitigation measures recommended by FLMs may include stringent control technologies to minimize the increase in emissions and the impact on AQRVs. Monitoring can determine whether predicted resource conditions are observed. Offsets ensure that net emissions reductions from all sources will occur within a geographic area and their resulting air quality impacts at the Class I area will be mitigated.

## 2.3. Other Air Quality Review Considerations (Revised)

At all Class I areas where visibility has been monitored, visibility conditions have been found to be impaired by human-caused pollution. The impairment comes primarily from older sources, not new sources. From a regional perspective, new or modified sources (using new/cleaner technologies) contribute far less to impaired AQRV conditions than old sources. EPA has implemented a call for reducing NO<sub>x</sub> emissions from older sources in the eastern U.S. to meet existing ozone standards. In addition to complying with national ambient standards, States are now developing plans to implement EPA's Regional Haze Regulations. If these requirements are implemented, then progress toward remedying impaired AQRVs is likely. However, given the sensitivity of some AQRVs to low levels of pollution, programs focused on reaching national goals, such as the NAAQS or visibility, may not fully remedy impacts on AQRVs in all locations. It is for this reason that the FLM does pursue other strategies to protect AQRVs. The following sections discuss FLM issues that go beyond NSR.

### 2.3.1. Remedying Existing Adverse Impacts

Allowing the existence of adverse impacts would be inconsistent with the mandates of the FLM agencies. Consequently, FLMs may request or participate in regional assessments to protect AQRVs, and remedy any existing adverse impacts on AQRVs, as appropriate. Regional assessments often use a multi-faceted approach to remedy impairment. For example, categories addressed by the Grand Canyon Visibility Transport Commission (GCVTC) include air pollution prevention; clean air corridors; stationary sources; sources in and near Class I areas; mobile sources; road dust; fire; and future regional coordination.

Clean Air Act requirements for remedying existing visibility impairment provide a mechanism for addressing impacts from specific sources or groups of sources [42 USC 7491]. Negotiations at the Centralia Power Plant in the state of Washington provide an example of how to build partnerships and work collaboratively to obtain retrofit controls or more stringent control technologies for sources that affect a FLM area. Through a collaborative decision making process, owners of the Centralia plant agreed to reduce sulfur dioxide emissions at the plant by 90%. In another case, the FWS identified plume impacts from a pulp and paper mill located seven miles upwind of the Moosehorn Wilderness Area. Using cameras provided by the IMPROVE monitoring network, plumes from the mill were documented entering the Moosehorn Wilderness Area. In collaboration with the State of Maine, additional controls for nitrogen oxides and updated particulate controls were incorporated into the mill's PSD permit to address the plume impacts.



FLMs may also coordinate with others to ensure that emission reductions in nonattainment areas will improve air quality in FLM areas. Recommendations on urban planning were developed with FLM involvement to address nonattainment areas in California. Data documenting ozone effects on vegetation were provided to the planning authority.

### 2.3.2. Requesting State Implementation Plan (SIP) Revisions to Address AQRV Adverse Impacts (Revised)

A SIP is the mechanism that states use to develop the pollution control programs that will be used to achieve and maintain the NAAQS, as well as prevent significant deterioration of air quality. It is important for FLMs to be involved in SIP development, as participation provides an opportunity to influence planning of pollution control programs that can benefit air quality in FLM areas. Once a SIP is fully approved by EPA, it is legally enforceable under both State and Federal law. FLMs assist in the development of SIPs by providing analysis and comment to address existing impacts of concern. This approach is particularly useful for addressing impacts on AQRVs other than visibility, since the Clean Air Act does not provide specific requirements for other AQRVs.

SIP revisions could be used to address multiple sources and regional pollution that adversely affect AQRVs in all Class I areas. For example, in South Coast and San Diego, California, SIP revisions included FLM recommendations to reduce the impact of minor sources on AQRVs. South Coast recommendations addressed visibility while the San Diego recommendations addressed all AQRVs. EPA's NO<sub>x</sub> SIP Call in the east is another example of obtaining emission reductions through the SIP revision process. The NO<sub>x</sub> SIP Call was directed at 20 eastern States and the District of Columbia to address NO<sub>x</sub> emissions from existing large sources. Significant reductions in ozone formation and nitrogen deposition have occurred as a result of these efforts.

### 2.3.3. Periodic Increment Consumption Review (Revised)

EPA has indicated its intention to establish a SIP revision requirement to address existing adverse impacts on AQRVs. The FLMs strongly support EPA exercising its authority in this way. In the interim, however, there are existing SIP revision requirements that are not being fully utilized. EPA's current regulations require States to conduct a periodic review of the adequacy of their PSD plan and program. [40 CFR §51.166(a)(4)] This would include an assessment of increment consumption in Class I and Class II areas. Few States have ever conducted a comprehensive, cumulative increment consumption analysis for one or more Class I areas. In addition, many PSD sources have not exceeded the significant impact levels for increment consumption; thus,

few PSD permit applicants have had to perform a cumulative increment consumption analysis for Class I areas. Such a periodic increment consumption review would be beneficial given that the burden of proof for AQRV adverse impact determinations shifts from the FLM to the applicant when the increment has been consumed.

In its 1990 report, *Air Pollution: Protecting Parks and Wilderness From Nearby Pollution Sources*, the U.S. General Accounting Office (GAO) found that only 1 percent of the sources within 100 kilometers of five Class I areas it investigated were required to have permits under the PSD program, with 99 percent of the sources being minor or grandfathered sources. It also found that "non-PSD sources contribute from 53 to 90 percent of five of the six criteria pollutants emitted within a 100-kilometer radius of each of the five Class I areas." As part of its investigation, GAO noted that "a significant portion of total emissions of volatile organic compounds generally comes from small sources...and suggested that as part of the overall control strategy, States may want to consider lowering thresholds for regulating new sources to 25 tons of volatile organic compounds a year." According to the investigation, 55 percent of anthropogenic VOC emissions come from new sources or modifications totaling five tons per year or less. In a review of PSD permit applications near Mesa Verde National Park (a Class I area in Colorado), a cumulative modeling analysis of increment-consuming sources found that approximately 80 percent of the NO<sub>2</sub> Class I increment at the park had been consumed, but much of it by minor sources.

The FLMs have encouraged EPA to provide clearer direction on how often these periodic reviews should occur as the lack of a prescribed time-frame for conducting such analyses has clearly led to noncompliance with this requirement over the past twenty years by States.

## 2.4. Managing Emissions Generated in and Near FLM Areas (Revised)

Specific strategies need to be developed and implemented for reducing and preventing pollution from the many diverse sources and activities in communities surrounding FLM areas, including "gateway" communities (i.e., those adjacent to FLM areas). Accountability mechanisms are needed to ensure that appropriate actions are taken, reported and incorporated into SIPs, visibility protection plans, and Federal land management plans. Various forums (e.g., the Western Regional Air Partnership, and the Southern Appalachian Mountains Initiative) addressed some of the emissions sources of concern and developed regional strategies. In addition, EPA has formed other "regional planning organizations" for implementing its regional haze rule. FLMs participate in these forums, consistent with Federal law (e.g., Federal Advisory Committee Act), to the

maximum extent possible and coordinate their activities within those forums to ensure that comprehensive strategies are developed and implemented to address all the key emissions sources near FLM areas.

A systematic assessment of emission sources in and near FLM areas would be extremely helpful for formulating strategies aimed at mitigating or eliminating adverse impacts on area resources, and the NPS has performed micro-emission inventories for several of its Class I areas. However, without this assessment for all areas it is not possible to accurately quantify the extent to which these emissions contribute to the overall problem. Nevertheless, FLMs can, and should, take steps to minimize emissions generated on FLM lands even without an accurate inventory of emissions sources.

#### 2.4.1. Prescribed Fire

Prescribed fire is a land management tool used for multiple landscape objectives. Prescribed fire allows the FLM to mimic natural fire return intervals under controlled conditions where smoke management can minimize air quality impacts. The alternative is wildfires, which can be very difficult to control and may cause much more severe air quality impacts. A modeling assessment suggests that using prescribed fire to minimize wildfires can result in a net reduction in fine particle ( $PM_{2.5}$ ) emissions in the long-term. In the Pacific Northwest wildfire emissions were found to be greater than prescribed fire emissions in the same airshed (Ottmar 1996).

Since the early 1900s, wildfire has been aggressively suppressed on most of the nation's public lands to protect public safety, property, and to prevent what was thought to be the destruction of our natural and cultural resources. Fire-exclusion practices have resulted in forests, shrub lands, and grasslands plagued with a variety of problems, including overcrowding, resulting from the encroachment of species normally suppressed by fire; vulnerability of trees to insects and disease; and inadequate reproduction of certain species. In addition, heavy accumulation of fuels (such as dead vegetation on the forest floor) can cause fires to be catastrophic, which threatens firefighter and public safety, impairs forest and ecosystem health, destroys property and natural and cultural resources, and degrades air quality. The intense or extended periods of smoke associated with wildfires can also cause serious health effects and significantly decrease visibility.

FLMs recognize prescribed fire as a valuable tool; they also recognize that emissions from prescribed fire can be a significant source of air pollution. Smoke particles are also in the size range ( $< 2.5 \mu m$ ) that they play a significant role in visibility impairment. Particulate matter is the main pollutant of concern from smoke because it can cause serious health problems, especially for people with respiratory illness.

The FLMs are committed to minimizing the impacts from smoke by following sound smoke management practices, and if practical, using non-burning alternatives (i.e., mechanical clearing, chipping, mulching) to achieve land management objectives. Each prescribed burn site will have unique characteristics, but in general, smoke impacts can be minimized by burning during weather conditions that provide optimal humidity levels and dispersion conditions for the type of materials being burned, in addition to limiting the amount of materials and acreage burned at one time.

EPA has worked in partnership with land management agencies in the U.S. Departments of Agriculture, Defense, and the Interior; State Foresters; State air regulators; Tribes; and others to obtain recommendations and develop a national policy that addresses how best to improve the quality of wildland ecosystems (including forests and grasslands) and reduce threats of catastrophic wildfires through the increased use of managed fire, while achieving national clean air goals (EPA 1998b). EPA's interim air quality policy on fire describes criteria for wildland managers (federal, state, tribal, and private), and state and tribal air pollution agencies, to use in planning for and implementing prescribed fires, and recommends a variety of smoke management techniques that land managers can use to help reduce smoke impacts from prescribed fires. The policy is available at EPA's web site: <http://www.epa.gov/ttn/faca/fa08.html>. In addition, on March 22, 2007, EPA promulgated its Exceptional Events Rule that clarifies how ambient air quality standard exceedances from wildland fire will be treated in determining attainment and nonattainment status. In that rule, EPA committed to revising its 1998 wildland fire policy (72 FR 13560, March 22, 2007).

#### 2.4.2. Strategies to Minimize Emissions from Sources In and Near FLM Areas (Revised)

Aside from prescribed fire, other activities in and near FLM areas that generate air pollution include vehicle emissions, road building, operation of generators, oil and gas development, etc. Developing strategies for addressing natural resource impacts in or near an FLM area should not only take into consideration the type of activities generating the emissions and their amount, but also the existing condition of the resources of that area. More stringent measures should be recommended for sources in and near FLM areas that are already experiencing adverse effects from air pollution.

Examples of potential air pollution prevention practices that FLM agencies may encourage or develop and use are categorized under the following three strategies:

### ***Pollution Prevention Strategies***

- Review land management plans for affected FLM areas to assess whether they include strategies to limit and reduce air pollution emissions and incorporate protective measures into planning and decision documents.
- Place priority on pollution prevention.
- Encourage zero and near-zero emitting technologies.
- Promote energy conservation and the use of renewable energy sources.
- Promote use of clean fuels.

### ***Mobile Source Strategies***

- Promote the adoption of Low Emission Vehicle standards or the conversion of Federal fleets to alternative fuels.
- Improve control of evaporative emissions.
- Promote more stringent emission standards for the tour bus industry and other high-emitting vehicles used in federal areas (e.g., park shuttle vehicles).
- Considering restricting access of high emitting vehicles to sensitive areas.
- Retire high-emitting vehicles from Federal fleets as quickly as practicable and/or relocate high-emitting vehicles to less sensitive areas until they can be retired.
- Establish emission budgets from the transportation sector for selected FLM areas.
- Develop mass transit systems in some NPS units (e.g., light rail in Grand Canyon NP and a bus system in Zion NP).

### ***Minor Source Strategies (Revised)***

- Apply RACT, BACT, LAER, best and reasonably available control measures, etc., to existing federal sources, as appropriate.
- Recommend going beyond conformity requirements to include the protection of AQRVs in FLM areas, and ensure all actions FLMs can practicably control in and near FLM areas will not cause, or contribute to, an adverse impact on any AQRV.

Improved involvement with interested parties in gateway communities will likely be required to ensure growth in these communities occurs in a manner that mitigates the impact on natural resources. These communities may need to enhance their participation in the planning processes of FLMs. Similarly, FLMs should participate in planning activities for public lands located in the FLM area and communities adjacent to FLM areas to ensure air quality concerns are adequately addressed. Mechanisms should be identified and developed for community involvement in developing, implementing, and enforcing emission management strategies for sources near and in FLM areas.

Implementing strategies to achieve emission reductions in and near FLM areas will require efforts in at least three specific areas:

1. FLMs should ensure that sufficient emphasis is placed in agency planning documents requiring the minimization of air pollution emissions from new activities or practices.
2. FLMs should inventory air pollution emissions within FLM areas. After emissions have been quantified, FLMs, States, and adjacent communities will be able to assess the impact of these emissions through the use of appropriate models. Knowledge of Class I area emissions will also improve FLM ability to consult with States during the development and review of their SIPs (especially visibility SIPs). The NPS has developed an emissions inventory tool, the Climate Leadership in Parks (CLIP) Tool, that can be utilized by FLMs to inventory both greenhouse gases and all criteria air pollutants.
3. FLMs should cooperate with States and local communities in assessing the need for, and the development of, appropriate emission reduction strategies in and near FLM areas that address non-PSD sources. For Class I areas, the Regional Planning Organizations have completed analyses of emissions from nearby communities and activities that will serve as the basis for identifying strategies to reduce emissions. Without an acknowledgment from States and local communities that these sources may pose a threat to FLM areas and a systematic assessment of these potential impacts, current efforts to protect FLM area resources may be insufficient.

### **2.4.3. Conformity Requirements in Nonattainment Areas**

Conformity criteria and procedures ensure that actions on lands administered by Federal agencies do not cause a violation of the NAAQS, increase the frequency of any standards violations, or delay attainment of a standard. Conformity to SIPs is only required for activities within nonattainment areas for non-transportation related sources if emissions are above de minimis levels and regionally significant. Any activity that represents 10 percent, or more, of the emission inventory for that pollutant in the non-attainment or maintenance area is regionally significant. Examples of actions that may require a conformity determination include road paving projects, ski area development, or mining. Activities such as prescribed fire, that are included in a conforming land management plan, are exempt from conformity requirements. Please note that conformity determinations must be made in accordance with applicable EPA regulations, are typically done before a project is approved, and are part of the NEPA process.

The FLM should define the process to be used in conformity determinations and perform the conformity analysis before

a project is implemented. A conformity analysis typically includes emission calculations, public participation, mitigation measures/implementation schedules, and reporting methods. The Pacific Southwest Region of the USFS has published a *Conformity Handbook for FLMs* to assist in conformity compliance. In an approved Plan of Operation, FLMs can require monitoring. For example, in the case of Carlota Mine, located on National Forest land in

Arizona, the USFS requested additional mitigation measures to protect AQRVs in the Superstition Wilderness.

Transportation projects in FLM areas classified as nonattainment are subject to a more complicated transportation conformity process. Consultation with State and local air quality and transportation agencies will be required to comply with applicable regulations.

## 3. Subgroup Reports: Technical Analyses and Recommendations

### 3.1. Subgroup Objectives and Tasks

Subgroups were formed to address the four key issues relevant to AQRV identification and evaluation issues: policy (and procedures), visibility, ozone, and deposition. Each of these subgroups reviewed the commonalities among the FLMs then addressed the tasks assigned to them by FLAG. One of their first tasks was to differentiate between Phase I tasks, those which could be resolved in the short term without significant additional resources, and Phase II issues, those that would require a longer period or greater effort.

Subgroups were asked to reach common ground among the FLMs on the issues. The intent was to develop, to the extent possible, consistent policies, processes, and terminology that could be used when identifying AQRVs and evaluating impacts on AQRVs. This involves recommending consistent approaches for identifying air pollution effects on AQRVs, for determining adverse impacts, and for attributing adverse impacts to specific pollution sources. In addition, the FLMs consider that AQRV protection from visibility, ozone, and deposition impacts are equally important. However, we also recognize that given the current state of the science, attributing adverse impacts to specific sources are easier to document for visibility than for deposition and ozone, and easier for deposition than ozone.

The individual subgroup reports document the common policies, procedures, and definitions identified or developed during Phase I activities. The Visibility, Ozone, and Deposition subgroup reports are included below. The FLAG Policy Subgroup Report was used as the basis for much of the rest of this *FLAG Phase I Report*, including much of section 1 'Background' and section 2 'Federal Land Managers' Approach to AQRV Protection'.

### 3.2. Initial Screening Criteria (New)

Experience with the FLAG 2000 recommendations in dealing with many new source review applications led the Agencies to believe that an initial screen that would exempt a source from AQRV impact review based on its annual emissions and distance from a Class I area may be appropriate in most situations. As part of its Regional Haze Regulation, the EPA has introduced a screening criteria in its BART guidelines based on a source's annual emission strength and distance from a Class I area. The EPA stated that it would be reasonable to conclude that the following sources would not be considered to cause or contribute to visibility impairment:

- those located more than 50 km from any Class I area that emit less than 500 tons per year of  $\text{NO}_x$  or  $\text{SO}_2$  (or combined  $\text{NO}_x$  and  $\text{SO}_2$ ), and
- those located more than 100 km from any Class I area that emit less than 1,000 tons per year of  $\text{NO}_x$  or  $\text{SO}_2$  (or combined  $\text{NO}_x$  and  $\text{SO}_2$ ).

In both cases, the annual emissions over distance factor equates to 10.

The Agencies have concluded that a similar approach has merit with respect to new source impacts at Class I areas, for air pollution sources with relatively steady emissions throughout each year. However, the Agencies are modifying the size criteria to also include Particulate Matter less than 10 microns in size ( $\text{PM}_{10}$ ) and sulfuric acid mist ( $\text{H}_2\text{SO}_4$ ) emissions because those pollutants also impair visibility and contribute to other resource impacts. In addition, rather than the two-step BART test, the Agencies are using a fixed Q/D factor of 10 as a screening criteria for sources locating/located greater than 50 km from a Class I area. Furthermore, the Agencies are expanding the screening criteria to include all AQRVs, not just visibility. Therefore, the Agencies will consider a source locating greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total  $\text{SO}_2$ ,  $\text{NO}_x$ ,  $\text{PM}_{10}$ , and  $\text{H}_2\text{SO}_4$  annual emissions (in tons per year, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I



Acadia National Park, Maine.  
Credit: National Park Service



February 18, 2010

MEMORANDUM FOR HEADS OF FEDERAL DEPARTMENTS AND AGENCIES

FROM: NANCY H. SUTLEY, Chair, Council on Environmental Quality

SUBJECT: DRAFT NEPA GUIDANCE ON CONSIDERATION OF THE EFFECTS OF CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

I. INTRODUCTION

The Council on Environmental Quality (CEQ) provides this draft guidance memorandum for public consideration and comment on the ways in which Federal agencies can improve their consideration of the effects of greenhouse gas (GHG) emissions<sup>1</sup> and climate change in their evaluation of proposals for Federal actions under the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. This draft guidance is intended to help explain how agencies of the Federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500-1508. This draft guidance affirms the requirements of the statute and regulations and their applicability to GHGs and climate change impacts. CEQ proposes to advise Federal agencies that they should consider opportunities to reduce GHG emissions caused by proposed Federal actions and adapt their actions to climate change impacts throughout the NEPA process and to address these issues in their agency NEPA procedures.

The environmental analysis and documents produced in the NEPA process should provide the decision maker with relevant and timely information about the environmental effects of his or her decision and reasonable alternatives to mitigate those impacts. In this context, climate change issues arise in relation to the consideration of:

- (1) The GHG emissions effects of a proposed action and alternative actions; and
- (2) The relationship of climate change effects to a proposed action or alternatives, including the relationship to proposal design, environmental impacts, mitigation and adaptation measures.

NEPA demands informed, realistic governmental decision making. CEQ proposes to advise Federal agencies to consider, in scoping their NEPA analyses, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO<sub>2</sub>-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000

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<sup>1</sup> For purposes of this guidance, CEQ defines "GHGs" in accordance with Section 19(i) of Executive Order 13514 (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride).

metric tons of CO<sub>2</sub>-equivalent, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs.

CEQ does not propose to make this guidance applicable to Federal land and resource management actions, but seeks public comment on the appropriate means of assessing the GHG emissions and sequestration that are affected by Federal land and resource management decisions.

Because climate change is a global problem that results from global GHG emissions, there are more sources and actions emitting GHGs (in terms of both absolute numbers and types) than are typically encountered when evaluating the emissions of other pollutants. From a quantitative perspective, there are no dominating sources and fewer sources that would even be close to dominating total GHG emissions. The global climate change problem is much more the result of numerous and varied sources, each of which might seem to make a relatively small addition to global atmospheric GHG concentrations. CEQ proposes to recommend that environmental documents reflect this global context and be realistic in focusing on ensuring that useful information is provided to decision makers for those actions that the agency finds are a significant source of GHGs.

With regards to the effects of climate change on the design of a proposed action and alternatives, Federal agencies must ensure the scientific and professional integrity of their assessment of the ways in which climate change is affecting or could affect environmental effects of the proposed action. 40 CFR 1502.24. Under this proposed guidance, agencies should use the scoping process to set reasonable spatial and temporal boundaries for this assessment and focus on aspects of climate change that may lead to changes in the impacts, sustainability, vulnerability and design of the proposed action and alternative courses of action. At the same time, agencies should recognize the scientific limits of their ability to accurately predict climate change effects, especially of a short-term nature, and not devote effort to analyzing wholly speculative effects. Agencies can use the NEPA process to reduce vulnerability to climate change impacts, adapt to changes in our environment, and mitigate the impacts of Federal agency actions that are exacerbated by climate change.

Finally, CEQ seeks public comment on several issues not directly addressed by this draft guidance, including the assessment of climate change effects of land management activities, and means by which agencies can tailor the amount of the documentation prepared for NEPA analysis so that it is proportional to the importance of climate change to the decision-making process.

## II. CONSIDERATION OF THE EFFECTS OF A PROPOSED AGENCY ACTION ON GHG EMISSIONS: WHEN TO EVALUATE GHG EMISSIONS

By statutes, Executive Orders, and agency policies, the Federal government is committed to the goals of energy conservation, reducing energy use, eliminating or reducing GHG emissions, and promoting the deployment of renewable energy technologies that are cleaner and more efficient. Where a proposal for Federal agency action implicates these goals, information on GHG emissions (qualitative or quantitative) that is useful and relevant to the decision should be used when deciding among alternatives.

Many projects and programs proposed by the Federal government have the potential to emit GHGs. Accordingly, where a proposed Federal action that is analyzed in an EA or EIS would be anticipated to emit GHGs to the atmosphere in quantities that the agency finds may be meaningful, it is appropriate for the agency to quantify and disclose its estimate of the expected annual direct and indirect GHG emissions in the environmental documentation for the proposed action. Where the proposed

activity is subject to GHG emissions accounting requirements, such as Clean Air Act reporting requirements that apply to stationary sources that directly emit 25,000 metric tons or more of CO<sub>2</sub>-equivalent GHG on an annual basis,<sup>2</sup> the agency should include this information in the NEPA documentation for consideration by decision makers and the public. CEQ does not propose this reference point for use as a measure of indirect effects, the analysis of which must be bounded by limits of feasibility in evaluating upstream and downstream effects of Federal agency actions. In the agency's analysis of direct effects, it would be appropriate to: (1) quantify cumulative emissions over the life of the project; (2) discuss measures to reduce GHG emissions, including consideration of reasonable alternatives; and (3) qualitatively discuss the link between such GHG emissions and climate change. However, it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand. The estimated level of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives.

The reference point of 25,000 metric tons of direct CO<sub>2</sub>-equivalent GHG emissions may provide agencies with a useful indicator – rather than an absolute standard of insignificant effects -- for agencies' action-specific evaluation of GHG emissions and disclosure of that analysis in their NEPA documents. CEQ does not propose this reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, as that term is used by NEPA, but notes that it serves as a minimum standard for reporting emissions under the Clean Air Act. Evaluation of significance under NEPA is done by the action agency based on the categorization of actions in agency NEPA procedures and action-specific analysis of the context and intensity of the environmental impacts. 40 CFR 1501.4, 1508.27. Examples of proposals for Federal agency action that may warrant a discussion of the GHG impacts of various alternatives, as well as possible measures to mitigate climate change impacts, include: approval of a large solid waste landfill; approval of energy facilities such as a coal-fired power plant; or authorization of a methane venting coal mine. Other Federal policies, programs, or plans that cover multiple actions subject to NEPA – such as actions tiered from programmatic NEPA documents – may more appropriately address GHG emissions at the level of individual projects. In many cases, the GHG emissions of the proposed action may be so small as to be a negligible consideration. Agency NEPA procedures may identify actions for which GHG emissions and other environmental effects are neither individually or cumulatively significant. 40 CFR 1507.3.

Many agency NEPA analyses to date have found that GHG emissions from an individual agency action have small potential effects. Emissions from many proposed Federal actions would not typically be expected to produce an environmental effect that would trigger or otherwise require a detailed discussion in an EIS. Significant national policy decisions for which the action's GHG impacts are expected to be substantial have, on the other hand, required analysis of their GHG effects.

## **HOW TO EVALUATE GHG EMISSIONS**

To describe the impact of an agency action on GHG emissions, once an agency has determined that this is appropriate, CEQ proposes that agencies should consider quantifying those emissions using the

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<sup>2</sup> 25,000 metric tons may provide a useful, presumptive, threshold for discussion and disclosure of GHG emissions because it has been used and proposed in rule-makings under the Clean Air Act (e.g., EPA's Mandatory Reporting of Greenhouse Gases Final Rule, 74 FR 56260, October 30, 2009). This threshold is used in Clean Air Act rule-makings because it provides comprehensive coverage of emissions with a reasonable number of reporters, thereby creating an important data set useful in quantitative analyses of GHG policies, programs and regulations. See 74 FR 56272. This rationale is pertinent to the presentation of NEPA analysis as well.



following technical documents, to the extent that this information is useful and appropriate for the proposed action under NEPA:

- For quantification of emissions from large direct emitters: 40 CFR Parts 86, 87, 89, et al. Mandatory Reporting of Greenhouse Gases; Final Rule, U.S. Environmental Protection Agency (74 Fed. Reg. 56259-56308). Note that “applicability tools” are available (<http://www.epa.gov/climatechange/emissions/GHG-calculator/>) for determining whether projects or actions exceed the 25,000 metric ton of CO<sub>2</sub>-equivalent greenhouse gas emissions.
- For quantification of Scope 1 emissions at Federal facilities: Greenhouse gas emissions accounting and reporting guidance that will be issued under Executive Order 13514 Sections 5(a) and 9(b) (<http://www.ofee.gov>)
- For quantification of emissions and removals from terrestrial carbon sequestration and various other project types: Technical Guidelines, Voluntary Reporting of Greenhouse Gases, (1605(b) Program, U.S. Department of Energy (<http://www.eia.doe.gov/oiaf/1605/>))

Land management techniques, including changes in land use or land management strategies, lack any established Federal protocol for assessing their effect on atmospheric carbon release and sequestration at a landscape scale. Therefore, at this time, CEQ seeks public comment on this issue but has not identified any protocol that is useful and appropriate for NEPA analysis of a proposed land and resource management actions.

CEQ notes that agencies may also find useful information in the following sources:

- Renewable Energy Requirements Guidance for EPACT 2005 and EO 13423 ([http://www.ofee.gov/eo/epact05\\_fedrenewenergyguid\\_final\\_on\\_web.pdf](http://www.ofee.gov/eo/epact05_fedrenewenergyguid_final_on_web.pdf))
- EPA Climate Leaders GHG Inventory Protocols (<http://www.epa.gov/climateleaders/resources/inventory-guidance.html>)

For proposed actions that are not adequately addressed in the GHG emission reporting protocols listed above, agencies should use NEPA’s provisions for inter-agency consultation with available expertise to identify and follow the best available procedures for evaluating comparable activities. Agencies should consider the emissions source categories, measurement methodologies and reporting criteria outlined in these documents, as applicable to the proposed action, and follow the relevant procedures for determining and reporting emissions. The NEPA process does not require submitting a formal report or participation in the reporting programs. Rather, under this proposed guidance, only the methodologies relevant to the emissions of the proposed project need to be considered and disclosed to decision makers and the public.

## **WHAT DEPARTMENTS AND AGENCIES SHOULD CONSIDER AS PART OF THEIR GHG EVALUATION**

Federal agencies should structure their NEPA processes “to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.” 40 CFR 1502.1. Inherent in NEPA and the CEQ implementing regulations is a “rule of reason,” which ensures that agencies determine whether and to what extent to prepare an EIS based on the usefulness of any new potential information to the decisionmaking process.” *DOT v. Public Citizen*, 541 U.S. 752, 767 (2004). Where a proposed action is evaluated in either an EA or an EIS, the agency may look to reporting thresholds in the technical documents cited above as a point of reference for

determining the extent of direct GHG emissions analysis that is appropriate to the proposed agency decision. As proposed in draft guidance above, for Federal actions that require an EA or EIS the direct and indirect GHG emissions from the action should be considered in scoping and, to the extent that scoping indicates that GHG emissions warrant consideration by the decision maker, quantified and disclosed in the environmental document. 40 CFR 1508.25. In assessing direct emissions, an agency should look at the consequences of actions over which it has control or authority. *Public Citizen*, 541 U.S. at 768. When a proposed federal action meets an applicable threshold for quantification and reporting, as discussed above, CEQ proposes that the agency should also consider mitigation measures and reasonable alternatives to reduce action-related GHG emissions. Analysis of emissions sources should take account of all phases and elements of the proposed action over its expected life, subject to reasonable limits based on feasibility and practicality.

For proposed actions evaluated in an EIS, Federal agencies typically describe their consideration of the energy requirements of a proposed action and the conservation potential of its alternatives. 40 CFR 1502.16(e). Within this description of energy requirements and conservation opportunities, agencies should evaluate GHG emissions associated with energy use and mitigation opportunities and use this as a point of comparison between reasonable alternatives. For proposals normally evaluated in an EA, agencies may consider the GHG emissions as a factor in discussing alternative uses of available resources. 40 CFR 1508.9(b). CEQ proposes that this analysis should also consider applicable Federal, State or local goals for energy conservation and alternatives for reducing energy demand or GHG emissions associated with energy production.

Where an agency concludes that a discussion of cumulative effects of GHG emissions related to a proposed action is warranted to inform decision-making, CEQ recommends that the agency do so in a manner that meaningfully informs decision makers and the public regarding the potentially significant effects in the context of the proposal for agency action. This would most appropriately focus on an assessment of annual and cumulative emissions of the proposed action and the difference in emissions associated with alternative actions. Agencies may incorporate USGCRP studies and reports by reference in any discussion of GHG emissions and their effects. 40 CFR 1502.21.

Agencies apply the rule of reason to ensure that their discussion pertains to the issues that deserve study and deemphasizes issues that are less useful to the decision regarding the proposal, its alternatives, and mitigation options. 40 CFR 1500.4(f), (g), 1501.7, 1508.25. In addressing GHG emissions, consistent with this proposed guidance, CEQ expects agencies to ensure that such description is commensurate with the importance of the GHG emissions of the proposed action, avoiding useless bulk and boilerplate documentation, so that the NEPA document may concentrate attention on important issues. 40-CFR 1502.5, 1502.24.

An agency may decide that it would be useful to describe GHG emissions in aggregate, as part of a programmatic analysis of agency activities that can be incorporated by reference into subsequent NEPA analyses for individual agency actions. In addition, Federal programs that affect emissions or sinks and proposals regarding long range energy, transportation, and resource management programs lend themselves to a programmatic approach. For example, if GHG emissions or climate change and related effects in general are included in a broad (i.e., programmatic) EIS for a program, subsequent NEPA analyses for actions implementing that program at the project level should, if useful in the NEPA analysis for that decision, tier from the programmatic statement and summarize the relevant issues discussed in the programmatic statement. 40 CFR 1502.20, 1508.28. Such aggregated discussion may be useful under the consideration of agency compliance with requirements for Federal agencies to implement sustainable practices for energy efficiency, GHG emissions avoidance or reduction, petroleum products use reduction, and renewable energy, including bioenergy as well as other required sustainable practices. See, Executive Order 13514 – Federal Leadership in Environmental, Energy, and Economic Performance (74

Fed. Reg. 52117-52127); Executive Order 13423 - Strengthening Federal Environmental, Energy, and Transportation Management ([http://nepa.gov/nepa/regs/E.O.\\_13423.pdf](http://nepa.gov/nepa/regs/E.O._13423.pdf)). In particular, NEPA analyses for individual actions may incorporate by reference agency Strategic Sustainability Plans and account for GHG effects in accordance with Federal GHG reporting and accounting procedures to the extent that they are applicable to actions that carry out agency obligations under subsections 2(a), (b), (c) and (f) of Executive Order 13514. Such reference to the programmatic accounting of Federal agency GHG emissions under EO 13514 should note where appropriate that the scope of this accounting (for Scope 1, 2 and 3 emissions) may be much broader than the emissions that would be reasonable for assessment within the scope of an individual agency action under NEPA.

To the extent that a federal agency evaluates proposed mitigation of GHG emissions, the quality of that mitigation – including its permanence, verifiability, enforceability, and additionality<sup>3</sup> – should also be carefully evaluated. Among the alternatives that may be considered for their ability to reduce or mitigate GHG emissions are enhanced energy efficiency, lower GHG-emitting technology, renewable energy, planning for carbon capture and sequestration, and capturing or beneficially using fugitive methane emissions. In some cases, such activities are part of the purpose and need for the proposed action and the analysis will provide an assessment, in a comparative manner, of the alternatives and their relative ability to advance those objectives.

### III. CONSIDERATION OF CURRENT OR PROJECTED EFFECTS OF CLIMATE CHANGE ON PROPOSALS FOR AGENCY ACTION

CEQ proposes that agencies should determine which climate change impacts warrant consideration in their EAs and EISs because of their impact on the analysis of the environmental effects of a proposed agency action. Through scoping of an environmental document, agencies determine whether climate change considerations warrant emphasis or de-emphasis. 40 CFR 1500.4(g), 1501.7; See Scoping Guidance (CEQ 1981) (<http://www.nepa.gov/nepa/regs/scope/scoping.htm>) When scoping the impact of climate change on the proposal for agency action, the sensitivity, location, and timeframe of a proposed action will determine the degree to which consideration of these predictions or projections is warranted. As with analysis of any other present or future environment or resource condition, the observed and projected effects of climate change that warrant consideration are most appropriately described as part of the current and future state of the proposed action's "affected environment." 40 CFR 1502.15. Based on that description of climate change effects that warrant consideration, the agency may assess the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. Such effects may include, but are not limited to, effects on the environment, on public health and safety, and on vulnerable populations who are more likely to be adversely affected by climate change. The final analysis documents an agency assessment of the effects of the actions considered, including alternatives, on the affected environment.

Climate change can affect the environment of a proposed action in a variety of ways. For instance, climate change can affect the integrity of a development or structure by exposing it to a greater risk of floods, storm surges, or higher temperatures. Climate change can increase the vulnerability of a resource, ecosystem, or human community, causing a proposed action to result in consequences that are more damaging than prior experience with environmental impacts analysis might indicate. For example, an industrial process may draw cumulatively significant amounts of water from a stream that is dwindling because of decreased snow pack in the mountains or add significant heat to a water body that is exposed

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<sup>3</sup> Regulatory additionality requirements are designed to ensure that GHG reduction credit is limited to an entity with emission reductions that are above regulatory requirements. See [http://www.eia.doc.gov/oiaf/1605/FAQ\\_GenInfoA.htm#Additionality](http://www.eia.doc.gov/oiaf/1605/FAQ_GenInfoA.htm#Additionality);

to increasing atmospheric temperatures. Finally, climate change can magnify the damaging strength of certain effects of a proposed action.

Using NEPA's "rule of reason" governing the level of detail in any environmental effects analysis, agencies should ensure that they keep in proportion the extent to which they document their assessment of the effects of climate change. The focus of this analysis should be on the aspects of the environment that are affected by the proposed action and the significance of climate change for those aspects of the affected environment. Agencies should consider the specific effects of the proposed action (including the proposed action's effect on the vulnerability of affected ecosystems), the nexus of those effects with projected climate change effects on the same aspects of our environment, and the implications for the environment to adapt to the projected effects of climate change. The level of detail in the analysis and NEPA documentation of these effects will vary among affected resource values. For example, if a proposed project requires the use of significant quantities of water, changes in water availability associated with climate change may need to be discussed in greater detail than other consequences of climate change. In some cases, discussion of climate change effects in an EA or EIS may warrant a separate section, while in others such discussion may be integrated into the broader discussion of the affected environment.

When assessing the effects of climate change on a proposed action, an agency typically start with an identification of the reasonably foreseeable future condition of the affected environment for the "no action" alternative based on available climate change measurements, statistics, observations, and other evidence. See *Considering Cumulative Effects* (CEQ 1997) at [www.nepa.gov](http://www.nepa.gov). The reasonably foreseeable affected environment should serve as the basis for evaluating and comparing the incremental effects of alternatives. 40 CFR 1502.15. Agencies should be clear about the basis for projecting the changes from the existing environment to the reasonably foreseeable affected environment, including what would happen under this scenario and the probability or likelihood of this future condition. The obligation of an agency to discuss particular effects turns on "a reasonably close causal relationship between the environmental effect and the alleged cause." *Public Citizen*, 541 U.S. at 767. Where climate change effects are likely to be important but there is significant uncertainty about such effects, it may also be useful to consider the effects of any proposed action or its alternatives against a baseline of reasonably foreseeable future conditions that is drawn as distinctly as the science of climate change effects will support.

Climate change effects should be considered in the analysis of projects that are designed for long-term utility and located in areas that are considered vulnerable to specific effects of climate change (such as increasing sea level or ecological change) within the project's timeframe. For example, a proposal for long-term development of transportation infrastructure on a coastal barrier island will likely need to consider whether environmental effects or design parameters may be changed by the projected increase in the rate of sea level rise. See *Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study*, (<http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap4-7>), and *Abrupt Climate Change* (<http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap3-4> (discussing the likelihood of an abrupt change in sea level). Given the length of time involved in present sea level projections, such considerations typically would not be relevant to an action with only short-term considerations.

The process of adaptive planning requires constant learning to reduce uncertainties and improve adaptation outcomes. The CEQ NEPA regulations recognize the value of monitoring to assure that decisions are carried out as provided in a Record of Decision. 40 CFR 1505.3. In cases where adaptation to the effects of climate change is important, the significant aspects of these changes should be identified in the agency's final decision and adoption of a monitoring program should be considered. Monitoring

strategies should be modified as more information becomes available and best practices and other experiences are shared.

For sources of the best scientific information available on the reasonably foreseeable climate change impacts, Federal agencies may summarize and incorporate by reference the Synthesis and Assessment Products of the U.S. Global Change Research Program (USGCRP, <http://www.globalchange.gov/publications/reports/scientific-assessments/saps>), and other major peer-reviewed assessments from USGCRP. Particularly relevant is the report on climate change impacts on water resources, ecosystems, agriculture and forestry, health, coastlines and arctic regions in the United States. *Global Climate Change Impacts in the United States* (<http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts>). Research on climate change impacts is an emerging and rapidly evolving area of science. In accordance with NEPA's rule of reason and standards for obtaining information regarding reasonably foreseeable significant adverse effects on the human environment, action agencies need not undertake exorbitant research or analysis of projected climate change impacts in the project area or on the project itself, but may instead summarize and incorporate by reference the relevant scientific literature. See, e.g., 40 CFR 1502.21, 1502.22. Where agencies consider climate change modeling to be applicable to their NEPA analysis, agencies should consider the uncertainties associated with long-term projections from global and regional climate change models. There are limitations and variability in the capacity of climate models to reliably project potential changes at the regional, local, or project level, so agencies should disclose these limitations in explaining the extent to which they rely on particular studies or projections. 40 CFR 1502.21, 1502.22. The outputs of coarse-resolution global climate models, commonly used to project climate change scenarios at a continental or regional scale, require downscaling and bias removal (i.e., the adjustment of future projections for known systematic model errors) before they can be used in regional or local impact studies. See *Climate Models: An Assessment of Strengths and Limitations*. (<http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap3-1>).

Agencies should also consider the particular impacts of climate change on vulnerable communities where this may affect the design of the action or the selection among alternatives. Tribal and Alaska Native communities that maintain their close relationship with the cycles of nature have observed the changes that are already underway, including the melting of permafrost in Alaska, disappearance of important species of trees, shifting migration patterns of elk and fish, and the drying of lakes and rivers. These effects affect the survival for both their livelihood and their culture. Further, sovereign tribal governments with legal rights to reservations and trust resources are affected by ecological changes on the landscape in ways that many Americans are not.

#### IV. BACKGROUND

##### 1. NEPA and Cumulative Effects in General

NEPA was enacted to, *inter alia*, "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." NEPA Section 2, 42 U.S.C. § 4321. NEPA is best known for its action-forcing requirement that "all agencies of the federal government shall . . . include in every recommendation or report on . . . major federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on –

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.”

NEPA Section 102(2) (C), 42 U.S.C. § 4332(2) (C). This information must be provided for review by agencies with jurisdiction or special expertise regarding the environmental effects described. The agency’s “detailed statement,” known as an EIS, must be provided to the public, in accordance with NEPA Section 102(2)(C) and the Freedom of Information Act, and be incorporated into the agency decision-making process.

The EIS requirement thus has two purposes. First, it is meant to promote transparency and to ensure public accountability of agency decisions with significant environmental effects. In this sense, it promotes political checks and balances broader public interests against the motivations for agency action. Second, it is meant to ensure that agencies take account of those effects before decisions are made and as part of the agency’s own decision-making process. In this sense, it attempts to ensure that agencies consider environmental consequences as they decide how to proceed and take steps, when appropriate, to eliminate or mitigate adverse effects. The agency’s “responsibility is not simply to sit back, like an umpire, and resolve adversary contentions . . . Rather, it must itself take the initiative of considering environmental values at every distinctive and comprehensive stage of the process beyond the staff’s evaluation and recommendation.” *Calvert Cliffs Coordinating Comm., Inc. v. US Atomic Energy Comm’n*, 449 F.2d 1109, 1119 (D.C. Cir. 1971).

Alternatives analysis is an essential element of the NEPA process, both under section 102(2) (C) and in the EA of “conflicts concerning alternative uses of available resources” under Section 102(2) (E). The requirement of consideration of alternatives is meant to ensure that the agency consider approaches whose adverse environmental effects will be insignificant or at least less significant than those of the proposal. “This requirement, like the ‘detailed statement’ requirement, seeks to ensure that each agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance. Only in that fashion is it likely that the most intelligent, optimally beneficial decision will ultimately be made.” *Calvert Cliffs*, 449 F.2d at 1114.

NEPA analysis and documentation should be designed to both inform Federal agency decisions and provide for collaborative, coordinated decisions by making “advice and information useful in restoring, maintaining, and enhancing the quality of the environment” available to States, Tribes, counties, cities, institutions and individuals. Section 102(2) (G), 42 U.S.C. § 4332(2) (G). NEPA also requires Federal agencies to support international cooperation by recognizing “the global character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind’s world environment.” Section 102(2) (F), 42 U.S.C. § 4332(2) (F).

Federal actions may cause effects on the human environment that are not significant environment effects, in isolation, but that are significant in the aggregate or that will lead to significant effects. Since 1970, CEQ has construed the term “major Federal actions significantly affecting the quality of the human environment” as requiring the consideration of the “overall, cumulative impact of the action proposed (and of further actions contemplated).” 35 Fed. Reg. 7390, 7391 (1970). “Cumulative impact” is defined in CEQ’s NEPA regulations as the “impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . .” 40 C.F.R. § 1508.7. Cf. *Kleppe v. Sierra Club*, 427 U.S. 390, 413-414 (1976). CEQ interprets this regulation as referring only to the cumulative impact of the direct and indirect effects of the proposed action or its alternatives when added to the aggregate effects of past, present, and reasonably foreseeable future

actions. See, CEQ Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005) at 2, 3 ([www.nepa.gov/nepa/regs/Guidance\\_on\\_CE.pdf](http://www.nepa.gov/nepa/regs/Guidance_on_CE.pdf)).

As explained in prior CEQ guidance, and described in its handbook *Considering Cumulative Effects*, the analysis of cumulative effects begins with consideration of the direct and indirect effects on the environment that are expected or likely to result from a proposal for agency action or its reasonable alternatives. See *Considering Cumulative Effects* (CEQ 1997) at [www.nepa.gov](http://www.nepa.gov). Agencies then should consider the affected environment by looking for effects of past, present, and reasonably foreseeable future actions that are, in the judgment of the agency, relevant because their effects would increase or change in combination with the direct and indirect effects of the proposal for agency action or its alternatives. The relevant cumulative effects typically result from human activities with effects that accumulate within the temporal and geographic boundaries of the effects of the proposed action.

The purpose of cumulative effects analysis is to document agency consideration of the context and intensity of the effects of a proposal for agency action, particularly whether the action is related to other actions with individually insignificant but cumulatively significant impacts. 40 CFR 1508.27(b) (7). After such documentation, the dual purposes of NEPA will be satisfied. The public can scrutinize the relevant effects, and the agency, having been made alert to them, can decide how to proceed. The Supreme Court has emphasized that agencies may properly limit the scope of their cumulative effects analysis based on practical considerations. *Kleppe*, 427 U.S. at 414 (“Even if environmental interrelationships could be shown conclusively to extend across basins and drainage areas, practical considerations of feasibility might well necessitate restricting the scope of comprehensive statements”). See also 40 CFR 1502.22 (regarding acquisition and disclosure of information that is “relevant to reasonably foreseeable significant adverse impacts” and “essential to a reasoned choice among alternatives”).

## 2. Climate Change in General.

The science of climate change is rapidly developing, and is only briefly summarized in this guidance to illustrate the sources of scientific information that are presently available for consideration. CEQ’s first Annual Report in 1970 discussed climate change, concluding that “man may be changing his weather.” Environmental Quality: The First Annual Report at 93. At that time, human activities had increased the mean level of atmospheric carbon dioxide to 325 parts per million (ppm). Since 1970, the concentration of atmospheric carbon dioxide has increased at a rate of about 1.6 ppm per year (1979-2008) to the present level of approximately 385 ppm (2008 globally averaged value). See U.S. Department of Commerce, National Oceanic and Atmospheric Administration Earth Systems Research Laboratory (<http://www.esrl.noaa.gov/gmd/ccgg/trends/>). The atmospheric concentrations of other, more potent GHGs have also increased to levels that far exceed their levels in 1750, at the beginning of the industrial era. As of 2004, human activities annually produced more than 49 billion tons of GHG measured in carbon dioxide equivalency according to the Intergovernmental Panel on Climate Change (IPCC). IPCC Fourth Assessment Report: Synthesis Report at 38 ([http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)). Nearly every aspect of energy choices and use affect the development of fossil fuel and other energy resources, either adding to or reducing the cumulative total of GHG emissions.

It is now well established that rising global GHG emissions are significantly affecting the Earth’s climate. These conclusions are built upon a scientific record that has been created with substantial contributions from the United States’ Global Change Research Program (formerly the Climate Change Science Program), which facilitates the creation and application of knowledge of the Earth’s global environment through research, observations, decision support, and communication. (<http://www.globalchange.gov/>)

Based primarily on the scientific assessments of the USGCRP and NRC, EPA has issued a finding that the changes in our climate caused by GHG emissions endanger public health and welfare. (Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, December 15, 2009, 74 Fed. Reg. 66496). Ambient concentrations of GHGs do not cause direct adverse health effects (such as respiratory or toxic effects), but public health risks and impacts as a result of elevated atmospheric concentrations of GHGs occur via climate change. 74 Fed. Reg. at 66497-98. For example, EPA has estimated that climate change can exacerbate tropospheric ozone levels in some parts of the U.S. Broadly, EPA states that the effects of climate change observed to date and projected to occur in the future include, but are not limited to, more frequent and intense heat waves, more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems. The Administrator has determined that these impacts are effects on public health and welfare within the meaning of the Clean Air Act. However, the Administrator does not currently believe that it is possible to quantify with great specificity (i.e. geographic), the various health effects from climate change but, because the risks from unusually hot days and nights and from heat waves are very serious, has proposed to find that on balance that these risks support a finding that public health is endangered even if it is also possible that modest temperature increases will have some beneficial health effects. The EPA findings cite IPCC reports that climate change impacts on human health in U.S. cities will be compounded by population growth and an aging population and GCRP reports that climate change has the potential to accentuate the disparities already evident in the American health care systems as many of the expected health effects are likely to fall disproportionately on the poor, the elderly, the disabled, and the uninsured.

## V. CONCLUSION

With the purpose of informing decision-making, CEQ proposes that the NEPA process should incorporate consideration of both the impact of an agency action on the environment through the mechanism of GHG emissions and the impact of changing climate on that agency action. This is not intended as a “new” component of NEPA analysis, but rather as a potentially important factor to be considered within the existing NEPA framework. Where an agency determines that an assessment of climate issues is appropriate, the agency should identify alternative actions that are both adapted to anticipated climate change impacts and mitigate the GHG emissions that cause climate change. As noted above, NEPA analysis of climate change issues necessarily will evolve to reflect the scientific information available and the legal and policy context of decisions that the NEPA process is intended to inform. Therefore, once this guidance is issued in final form, CEQ intends to revise it as warranted to reflect developments in the law, policy, and science regarding climate change.

## VI. SPECIFIC QUESTIONS FOR PUBLIC REVIEW

In addition to comments on this draft guidance document, CEQ also requests comment on land and resource management issues, including:

1. How should NEPA documents regarding long-range energy and resource management programs assess GHG emissions and climate change impacts?
2. What should be included in specific NEPA guidance for projects applicable to the federal land management agencies?
3. What should be included in specific NEPA guidance for land management planning applicable to the federal land management agencies?
4. Should CEQ recommend any particular protocols for assessing land management practices and their effect on carbon release and sequestration?



5. How should uncertainties associated with climate change projections and species and ecosystem responses be addressed in protocols for assessing land management practices?
6. How should NEPA analyses be tailored to address the beneficial effects on GHG emissions of Federal land and resource management actions?
7. Should CEQ provide guidance to agencies on determining whether GHG emissions are “significant” for NEPA purposes. At what level should GHG emissions be considered to have significant cumulative effects. In this context, commenters may wish to consider the Supreme Court decision in Massachusetts v. EPA, 549 U.S. 497, 524 (2007).

After consideration of public comment, CEQ intends to expeditiously issue this guidance in final form. In the meantime, CEQ does not intend this guidance to become effective until its issuance in final form.

# # #

(UTC)

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**From:** Marla Nelson <msnelson@nedc.org>  
**Sent:** Wednesday, December 18, 2013 3:19 PM  
**To:** EFSEC (UTC)  
**Cc:** JJ England  
**Subject:** NEDC Scoping Comments re Tesoro Savage Proposal  
**Attachments:** NEDC Scoping Comments\_Tesoro Savage Crude Oil Terminal.pdf; Exhibit 5 - Seedah and Harrison re Measuring the Impact of Rail.pdf; Exhibit 1 - Santa Barbara Study re Vessel Emissions.pdf; Exhibit 2 - de Place re increased rail traffic.pdf; Exhibit 3 - Vorhees re coal dust and derailment.pdf; Exhibit 4 - Montreal Maine & Atlantic re Quebec.pdf

**Categories:** Red Category

Attached please find scoping comments from the Northwest Environmental Defense Center. There are 10 exhibits, which may be attached in later emails per size constraints.

Thank you,  
Marla Nelson

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Spokane Clean Water Project  
You can access my papers on SSRN here



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December 18, 2013

Via Email to [efsec@utc.wa.gov](mailto:efsec@utc.wa.gov)

Stephen Posner  
Energy Facility Site Evaluation Council  
P.O. Box 43172  
1300 S. Evergreen Park Dr. S.W.  
Olympia, WA 98504-3172

**Re: State Environmental Policy Act Scoping Comments on Tesoro/Savage's  
Proposed Crude Oil Transit Terminal at the Port of Vancouver**

Dear Mr. Posner and the Energy Facility Siting Evaluation Council:

The Northwest Environmental Defense Center (NEDC) respectfully submits these comments to the Energy Facility Siting Evaluation Council (EFSEC) regarding Tesoro Savage Petroleum Terminal LLC's (Tesoro) Site Certification application for the Tesoro Savage Vancouver Energy Distribution Terminal Project, Application No. 2013-01, Docket No. EF-131590 (Terminal). Tesoro's proposal for a crude oil transit terminal is of significant interest to NEDC based on the adverse environmental impacts that will result if the Terminal is constructed.

Consistent with the stated purpose of Washington's State Environmental Policy Act (SEPA) to, among other things, "promote efforts which will prevent or eliminate damage to the environment and biosphere," NEDC urges EFSEC to carefully review the environmental risks associated with this Terminal. RCW 43.21C.010. For major actions significantly affecting the quality of the environment, SEPA requires state agencies to prepare a detailed statement, or environmental impact statement (EIS), that addresses, *inter alia*, the environmental impact of the proposed action, any unavoidable adverse environmental effects of the proposal, and alternatives. RCW 43.21C.030. Given NEDC's mission to protect and conserve the natural resources of the Pacific Northwest, we are especially concerned about both (1) the direct, localized adverse environmental impacts, and (2) the substantial indirect and cumulative adverse environmental impacts that will result from the construction and operation of the Terminal.

First and foremost, NEDC is concerned that the lease agreement entered by the Port of Vancouver and Tesoro will improperly limit the range of alternatives that EFSEC

considers, resulting in a faulty EIS. Second, NEDC requests that EFSEC consider the cumulative impacts that will result from the Terminal when considered in addition to the impacts from numerous other fossil fuel transport projects proposed in the region. Last, NEDC identifies a variety of environmental impacts that EFSEC should cover in the EIS.

**I. EFSEC's ability to consider a range of alternatives in the EIS is improperly limited by the Port of Vancouver's lease agreement with Tesoro.**

Pursuant to SEPA, state agencies must consider alternatives to a proposed action. RCW 43.21C.030. The rules promulgated under SEPA, and adopted by EFSEC,<sup>1</sup> prohibit any action concerning a proposal that would limit the choice of reasonable alternatives. WAC 197-11-070(1)(b). A proposal exists "when an agency is presented with an application or has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing the goal and the environmental effects can be meaningfully evaluated." WAC 197-11-784. Preparation of an EIS and consideration of alternatives should be completed "at the earliest possible time to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to seek to resolve potential problems." WAC 197-11-055. In this case, the Port of Vancouver's lease agreement with Tesoro was an agency action on a proposal that limited EFSEC's choice of reasonable alternatives.

Although Tesoro had not yet submitted its site certification application to EFSEC when the Port of Vancouver approved the lease decision on or about July or October of 2013, Tesoro did have a very real goal of transporting crude oil by rail and marine vessel through the Port of Vancouver at that time and Tesoro had already identified the specific Terminal proposal that was later presented in its application to EFSEC. The Port was aware that the timing of its lease decision may have been out of order. EFSEC's Jim Luce presented the EFSEC process to the Port on June 27, 2013. Numerous citizens requested the Port to consider the environmental implications of its lease decision at various workshops hosted by the Port over the summer of 2013. Plus, Port Commissioner Brian Wolfe noted that it appeared the Port was placing the "cart before the horse" by making a lease decision before the environmental impacts of the proposed Terminal had been considered. Yet the Port decided to proceed and sign the lease.

The environmental effects of the proposed Terminal could have, and should have been meaningfully evaluated at the time the Port entered into the lease. Instead, however, the Port of Vancouver signed a lease with Tesoro, committing the Port to specific terms of a lease contract. Tesoro then submitted its application for site certification to EFSEC on August 29, 2013. As a result, public comments on the Terminal as presented to EFSEC have focused on the now-determined location at the Port of Vancouver. This lease decision, made before EFSEC prepared its EIS, precludes many reasonable alternatives that the public has been prevented from commenting on and that EFSEC should consider in its EIS.

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<sup>1</sup> WAC 463-47-020 (EFSEC's rule adopting by reference sections of chapter 197-11 WAC, including WAC 197-11-070).

For example, Tesoro's site certification application states that Tesoro will obtain all necessary insurance coverage for construction and operation of the Terminal and outlines in basic terms its planned mitigation measures. *See* August 2013 Tesoro Savage Vancouver Energy Distribution Terminal Application (Application), pages 1-6 to 1-8. Yet the Port's lease agreement with Tesoro sets forth specific obligations for property, liability, and pollution legal liability insurance. *See* August 1, 2013 Ground Lease between the Port of Vancouver and Tesoro Savage Petroleum Terminal LLC, pages 5-6. These amounts were determined before the Port, Tesoro, EFSEC, or the public were able to understand and assess the magnitude of the adverse environmental impacts likely to result from the Terminal. As such, the lease agreement improperly limits EFSEC from requiring insurance commensurate with the environmental impacts of the Terminal, (the impacts of which EFSEC has yet to assess), and making a meaningful comparison with other reasonable alternatives.

Further, the lease indicates the Port's support for the Terminal and creates an investment expectation that EFSEC cannot ignore when considering the impacts that a site certification would have on Vancouver. The lease agreement will be a coercive factor in EFSEC's environmental analysis, contrary to the SEPA's design. Alternatives to the Terminal include transporting the crude oil to refineries by pipeline rather than rail, transporting the crude oil directly to the refineries by rail, and a no action alternative.

The terms of the lease agreement cabin specific aspects of the proposed Terminal, restrict EFSEC's and the public's review of the Terminal, and thereby limit the range of alternatives that EFSEC will consider. Because decisions made in violation of SEPA are *ultra vires* and should be set aside, *see Noel v. Cole*, 98 Wash. 2d 375, 655 P.2d 245 (1982), EFSEC should set aside the lease agreement between the Port of Vancouver and Tesoro before completing its EIS to allow for full consideration of all reasonable alternatives.

**II. EFSEC should consider the cumulative impact on the environment that will result from this crude oil transit terminal, when considered in combination with the impacts of the numerous other fossil fuel transport projects in the region.**

It is crucial that EFSEC consider the cumulative impacts of this Terminal in combination with the other various fossil fuel transport projects underway in the Pacific Northwest, either in a comprehensive detailed statement under SEPA or by addressing those projects as cumulative or similar actions. An individual analysis of each fossil fuel transport facility would ignore the inescapable result that, in the cumulative, these projects will have significant, adverse impacts on the environment of the Pacific Northwest. Currently, there are at least ten crude oil-by-rail construction or expansion projects underway in Washington:

- (1) BP and (2) Phillips 66 in Ferndale
- (3) Tesoro and (4) Shell in Anacortes

- (5) Phillips 66 and (6) US Oil in Tacoma
- (7) US Development, (8) Westway Marine and (9) Imperium in Grays Harbor
- (10) Tesoro's proposal for this Terminal at the Port of Vancouver.

In addition, NEDC is aware of other fossil fuel export terminals in Washington and Oregon that have recently been permitted or are currently in the permitting process:

- BHP Billiton potash export facility at the Port of Vancouver, WA
- Millennium Bulk coal export terminal in Longview, WA
- Gateway Pacific coal export terminal at Cherry Point, WA
- Ambre Energy coal export terminal proposed for the Port of Morrow, Oregon

SEPA requires all branches of Washington's government to "[i]dentify and develop methods and procedures . . . which will insure that presently unquantified environmental amenities and values will be given appropriate consideration in decision making along with economic and technical considerations." RCW 43.21C.030. The environmental impacts that will result from the Terminal alone are substantial, and are even more so when added to similar impacts that will be caused by the numerous other fossil fuel transport facilities currently seeking approval in the Pacific Northwest that have yet to be quantified. These facilities, considered in the cumulative, could add as many as forty unit trains per day on one stretch of track in Spokane and other Eastern Washington communities. Such projects are likely to add a substantial number of trains traveling in other areas of the state as well, including along the tracks adjacent to the Columbia River.

In addition, these proposals have the potential to dramatically increase vessel traffic in Washington's waterways and along its coast. Given the numerous fossil fuel transport terminals under consideration for the Pacific Northwest, and the significant regional, national and international impacts that will result from these projects, a comprehensive EIS is the best vehicle to analyze these impacts and address alternatives. EFSEC should work collaboratively with Washington's Department of Ecology to prepare a comprehensive detailed statement under SEPA that accounts for the cumulative impacts that will result from this crude oil transit terminal when considered in combination with the other fossil fuel transport projects proposed for the region.

In the alternative, EFSEC should consider the other fossil fuel transport projects proposed for the region as connected or similar actions. *See* WAC 197-11-792(2)(a) (defining connected actions as "proposals or parts of proposals which are closely related," and defining similar actions as "proposals that have common aspects and may be analyzed together"). Here, the numerous fossil fuel transport facilities described above have both common timing and common geography.

Similarly, EFSEC should consider the increase in rail and marine vessel traffic and mining activities, and associated impacts (described below), as either connected or similar actions in the EIS. Tesoro cannot achieve its stated purpose of providing North American crude oil to U.S. refineries to offset or replace declining Alaska North Slope

crude reserves without increasing the amount of rail and marine traffic to transport the 360,000 barrels of crude oil it anticipates shipping each day. The SEPA Handbook explains:

A large proposal involving actions in vastly different locations, such as material being mined at one site, then transported to and processed at another, is another example of defining the entire proposal. Appropriate environmental review would look at the impacts of all the related activities.

SEPA Handbook, at 11-12. Because Tesoro cannot realize its stated goals without the increased rail traffic, increased marine vessel traffic, and continued fracking, these actions constitute connected actions that should be considered in EFSEC's EIS. *See* WAC 197-11-060(3)(b) (noting that "[p]roposals or parts of proposals that are related to each other closely enough to be, in effect, a single course of action shall be evaluated in the same environmental document").

At the very least, EFSEC must consider the impacts of the other fossil fuel transport projects in its cumulative impacts analysis. *See* WAC 197-11-060(4) (requiring an EIS under SEPA to analyze "direct, indirect, and cumulative impacts"). *See also* WAC 197-11-792(2)(c) (stating that in determining the scope of an EIS, agencies must consider direct, indirect and cumulative impacts). The numerous proposals for fossil fuel transport facilities in the Pacific Northwest will have cumulative impacts that should be considered in EFSEC's detailed statement. *See Cheney v. City of Mountlake Terrace*, 87 Wash.2d 338, 344, 552 P.2d 184 (1976) (explaining that SEPA requires decision-makers to consider more than just the "narrow, limited environmental impact of the immediate pending action," and implying that the scope of indirect and cumulative impacts are not limited by local jurisdictional borders).

A majority of these fossil fuel transport projects are also likely to occur, as they are farther along in the permitting process than Tesoro's proposed Terminal and many have completed leases with the relevant ports. *See* WAC 197-11-060(4)(a) (requiring consideration of environmental impacts, "with attention to impacts that are likely"). It is likely that construction and operation of each of the pending fossil fuel transport facilities described above will overlap with this Terminal because many of the projects are actively seeking or have received permits.

The number of pending similar actions that will have similar impacts from transportation by rail or marine vessel constitute a substantial and pressing need for EFSEC to account for these cumulative impacts together in a single EIS. The fourteen proposals are likely to add sizable stress on the environment and communities that are in or near where these transportation impacts will occur. These proposals will add substantial stress to Washington's railways and waterways. This is precisely the type of situation where analyzing cumulative impacts strongly serves the public interest: such analysis may bring to light important information relating to impacts and alternatives that can help facilitate proper planning moving forward.

Finally, EFSEC should consider the impacts of increased rail and marine vessel traffic as indirect impacts. Indirect impacts are those that occur away from the project area but are nonetheless caused by the project. *See, e.g.,* SEPA Handbook at 56. Construction and operation of the Terminal will cause significant indirect impacts across the state. For example, Tesoro anticipates four separate unit trains and one large ocean-going vessel will travel to and from the Terminal daily. Each train will measure approximately 7,800 feet in length, or about 1.5 miles. *See* Application at 2.3.3.1. Four round trip trains would result in twelve miles of additional trains on the same tracks each day. The projected increased marine traffic is likewise staggering. The Port currently handles about 400-500 vessel calls per year. The Terminal project would nearly double that number by adding an additional 365 vessel calls per year. The environmental impacts of these increased train and rail trips will cause adverse impacts to air, water, spill risk, safety, emergency response times, and public health.

Absent this analysis, adding this many trains and vessels at once to Washington's system without a clear plan is risky and dangerous. Thus NEDC urges EFSEC to consider the cumulative impacts of this Terminal in addition to the numerous other fossil fuel transport facilities proposed in the region.

### **III. EFSEC should clarify and restate Tesoro's statement of purpose.**

The statement of purpose is central to a proper EIS because it provides the guideposts for the analysis of actions, alternatives, and effects. If the statement is too narrow, it prevents useful analysis of alternatives that could meet the broad goal of a project. *See* WAC 197-11-060 (stating that "[p]roposals should be described in ways that encourage considering and comparing alternatives" and noting that "[a]gencies are encouraged to describe public or nonproject proposals in terms of objectives rather than preferred solutions"). Consistent with these goals, EFSEC should clarify and restate the purpose of Tesoro's proposed Terminal.

Tesoro's stated purpose for the Terminal is to transfer crude oil from rail cars to ships. *See* Application at 2.1.4. This purpose is far too narrow to facilitate analysis of meaningful alternatives for two reasons. First, it does not include the necessary transportation to and from the Terminal as part of the project proposal, even though the SEPA handbook indicates that these are precisely the types of activities that should be included as part of the project itself. *See* SEPA Handbook at 11-12. In other words, the current statement of purpose is limited solely to the Terminal site itself but the direct impacts of project fall within a much broader geographic scope. Second, the stated purpose to "transfer crude oil from rail cars to ships" improperly limits the concept to a rail-to-marine vessel transport project, thereby precluding other viable alternatives such as transporting petroleum products through a pipeline or solely by rail to the refineries.

NEDC recommends that EFSEC redefine the statement of purpose to be more objective and avoid a narrow description that precludes consideration of alternatives. For example, EFSEC could state the purpose in the following way: "The objective of this project is to transport petroleum products to refineries." While this objective stays true to



the project's purpose, it also incorporates the correct scope of the project and facilitates discussion of meaningful alternatives.

**IV. Tesoro's proposed Terminal will have wide-ranging adverse environmental impacts that EFSEC must address in its EIS.**

It is clear that Tesoro's proposed Terminal will have numerous direct, indirect, and cumulative adverse impacts on water quality, air quality, wildlife, and human health that EFSEC must consider in its EIS. NEDC has highlighted a few of these impacts below.

*Increased rail traffic*

The increase in train traffic that will result if the Terminal is approved will have multiple repercussions for the region's resources. The high volume of oil being transported to the Terminal will require 4 daily trains (8, considering return routes), each a mile and a half in length. This increase in rail traffic will undoubtedly have numerous direct consequences for the environment, local human populations, and existing infrastructure. For example, increased rail traffic is likely to cause traffic delays throughout Washington. See Dan Seedah & Robert Harrison, *Measuring the Impact of Intermodal Rail Movements in State Transportation Planning*, The University of Austin, Texas (attached hereto as Exhibit 5). That same increased rail traffic is likely to decrease property values for homes near the freight rail lines, increase delays in emergency response times for communities located along the rail lines, and increase the noise pollution that these communities are subjected to on a daily basis.

*Increased marine vessel traffic*

Tesoro proposes to add 730 deep draft freighter trips to vessel traffic on the Lower Columbia River. EFSEC should consider the risk of spills stemming from loading individual vessels at the Terminal. It should also consider the increased risk of vessel accidents that could lead to a spill on the Columbia River as a result of the cumulative increase in vessel traffic for each of the pending fossil fuel transport projects across the state. EFSEC should consider additional escort resources for vessels as a means to reduce the risk of spills associated with increased vessel traffic. For example, increasing the number of personnel on an escort tug from one to two individuals could substantially reduce the risk that human error might lead to a vessel accident.

EFSEC's EIS should consider air quality impacts associated with vessels, which are extraordinarily high emitters of criteria and hazardous pollutants. For example, the county of Santa Barbara, California, notes that more than half of its ambient NO<sub>x</sub> originates from vessels. See Santa Barbara County Air Pollution Control District, *The Need to Reduce Marine Shipping Emissions: A Santa Barbara County Case Study*, Paper # 70055 (attached hereto as Exhibit 1).

Finally, EFSEC should carefully consider the risk that vessels may introduce

invasive species through their ballast water releases. Specifically, greater vessel traffic increases the risk of introducing invasive species through ballast water carried from foreign ports that is discharged into the Columbia River. Like the risk of oil spills, although the chance of occurrence might be slim (based on Washington's ballast water discharge program, which requires an open sea exchange before discharging ballast water), the result would be devastating. The United Nations has identified the introduction of invasive species into new environments through ballast water as one of the greatest threats to the world's oceans. EFSEC should address the impact of increased vessel traffic and the increased risk of introducing invasive species to the region.

*Risk of disaster: fire, explosions, and spills*

Additional train and vessel traffic transporting crude oil increases the risk of disaster, which itself is an impact that EFSEC should address in the EIS. More trains will mean an increase in the likelihood of train derailment. Derailment could result in either oil being directly added to the aquatic ecosystem or indirectly as a result of surface runoff. Although a Burlington Northern Santa Fe (BNSF) HAZMAT official testified at the Spokane hearing that BNSF does not see many derailments, just one accident would be catastrophic to the environment. Current numbers on historic rail accidents paint an illusory picture because they are based on historically lower rail traffic. In the past year, commodity transport by rail has increased dramatically. *See Eric de Place, US Oil Train Trends: Four Basic Pictures*, Sightline Daily (2013) (attached hereto as Exhibit 2). The number of rail accidents and derailments are likely to correspondingly increase.

Further, a 2005 New York Times article, reporting the findings of a BNSF study, determined that coal dust can increase the likelihood of train derailments. *See Josh Vorhees, Railroads, Utilities Clash Over Dust From Coal Trains*, New York Times (2010) (attached hereto as Exhibit 3). When coal dust builds up in track beds, it prevents water from draining properly "which in turn can push steel rails out of gauge and cause derailments." *Id.* Given the simultaneous proposals for coal export facilities and the coincident increase in coal trains traversing the same tracks as the oil trains to the Terminal, EFSEC should account for this risk.

Any oil train derailments that occur on sections of track near the Columbia River could have severe environmental repercussions. On July 6, 2013, an oil train near Montreal, Canada, derailed, causing a massive explosion with a 1km blast radius that killed 42 people and destroyed over 30 buildings. *See Montreal, Maine & Atlantic Railway (MMA), Derailment in Lac-Megantic, Quebec*, July 6, 2013 (attached hereto as Exhibit 4). Oil was spilled and burned as a result. This very recent example highlights the importance of accounting for these kinds of risks in this project's EIS, which will directly cause four fully loaded, mile and a half long oil trains to embark across the state of Washington each day.

EFSEC should pay special attention to risks associated with this type of disaster occurring in an environmentally sensitive and valuable region, such as the trains that will cut through the Columbia River Gorge. EFSEC should also address the risk of a disaster

occurring in a populated area. BNSF's approach of addressing accidents or spills once they occur is backwards looking and likely to result in adverse impacts to the environment that could be avoided. Instead, EFSEC should require Tesoro and BNSF to proactively address the threat of a spill or accident by implementing measures to reduce risks and improve safety.

The Terminal's storage tanks will hold as much as 2,280,000 barrels of crude oil at any given time (6 tanks of 380,000 barrel capacity). For comparison, this is substantially more oil than spilled in the tragic Exxon Valdez disaster and is about 2/3 of the carrying capacity of the world's largest existing crude oil tanker. Given the carrying capacity of this facility combined with its explosive risk and risk of catastrophic environmental harm if released in large quantity, EFSEC should carefully consider the risk of fires, explosions, natural disasters, and spills to humans and the natural environment in its EIS.

In particular, EFSEC should carefully consider the impact of a 100 year and 1,000 year earthquake event on this facility, which is expected to have a lifespan of 20 years. Given the expected longevity of this facility, these risks are very real. Moreover, even if the risk of an event such as a 1,000 year earthquake is fairly small, the large quantity of volatile materials that will be stored at this facility means that a low risk event could nonetheless have catastrophic impacts. Tesoro's Application provides insufficient detail for how it plans to address the earthquake hazards for this region. *See Application*, page 1-10 – 1-11. EFSEC's analysis should require additional information from Tesoro to address the risk of an earthquake and the potential impacts to the surrounding area.

NEDC notes that Tesoro plans to use standard earthquake building codes for this facility. *See Application*, pages 1-10 – 1-11. EFSEC should carefully consider whether the bare minimum required by law is sufficient for this type of facility, especially given the high risk of liquefaction at the site and its adjacency to the Columbia River.

#### *Water Quality*

EFSEC should address the impacts to water quality from construction and operation of the Terminal, as well as water quality impacts that will result from the associated transportation activities and infrastructure. This includes impacts to groundwater from infiltration of runoff on the site. EFSEC should consider the impacts to surface water from storm water runoff from the site and additional marine vessel traffic on the Columbia River, and impacts to surface and groundwater due to increased risk of spill, including increased risks at the terminal, along the rail lines, and along the marine shipping routes. Finally, EFSEC should consider the impacts from storm water runoff from the rail lines and from the marine vessels.

#### *Lands and Wildlife*

EFSEC should consider the impact of additional train traffic on the stability of the shorelines along the Columbia River resulting from the increased development, rail

traffic and marine vessel traffic. The additional marine vessel traffic is likely to lead to bank erosion along the Columbia River. In addition, the development of the Terminal and associated rail and marine vessel traffic will likely adversely affect the City of Vancouver's master plan for the Columbia Waterfront Development project. EFSEC should consider the cumulative impacts from the construction of the Terminal in addition to this development, which will entail 3,300 residential units and 1 million square feet of commercial space on 32 acres of riverfront property that is bordered by the rail lines. EFSEC should also consider the adverse impacts to and cumulative impacts of the Waterfront Park Plan development, a 7.3 acre park and train within the waterfront.

Tesoro's proposed Terminal will also impact native vegetation and wildlife at the construction site as well as along the rail lines due to increased rail traffic. Trains have the potential to import invasive species, which may endanger native vegetation and wildlife. Because Tesoro is open to receiving petroleum products from various sources, including tar sands in Canada, the risk of introducing invasive species by passing train cars is very real. Plus, EFSEC should identify any plant or wildlife species listed under the Endangered Species Act as threatened or endangered. Finally, EFSEC should consider how the increased volume of trains will increase the number of wildlife deaths along the rail lines.

In addition, the Lower Columbia and its estuaries are critical habitat to threatened and endangered species. Increasing the volume of freight traffic, as noted above, increases the risk of introducing invasive species that might harm these listed species' and/or their designated critical habitat. Increased marine vessel traffic will also harm species by causing species to avoid the areas with greater traffic, increasing the risk of collision with species, and adversely modifying species' habitats through wave action prop wash.

#### *Local Air Quality*

Numerous sources at the Terminal will adversely impact air quality, each of which should be accounted for in the EIS. Specifically, EFSEC should account for criteria, HAP, and TAP emissions from sources located at the Terminal. These sources include: storage areas boilers, the unload boiler, the marine vapor combustion unit, dockside marine vessels, and locomotives actually operating at the facility.<sup>2</sup>

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<sup>2</sup> Although Tesoro explains in the Application that vessel and train emissions need not be included in its PSD permit, these emissions must nonetheless be accounted for as impacts resulting from the facility in the EIS. Further, NEDC disagrees that dockside emissions should not be included in the PSD permit. Rather, "certain activities of a ship docked at a terminal (i.e., when the vessel is stationary) may be considered emissions of the terminal if the activities would 'directly serve the purposes of the terminal and be under the control of its owner or operator to a substantial extent' (45 FR 52696)." See Letter from EPA to Ken Waid (Jan. 8, 1990). EFSEC must first collect information to determine whether dockside emissions meet that test.

This analysis should include a facility-wide TAP dispersion modeling analysis that accounts for preexisting ambient levels of: arsenic, benzene, cadmium, hexavalent chromium, diesel particulates, 7,12-Dimethylbenz(a)anthracene, NO<sub>2</sub>, and SO<sub>2</sub>. Given the large number of other air emitters in and around the port, determining baseline ambient air quality is particularly important to ensure that construction and operation of this facility will not lead violation of TAP ambient air quality regulations. *See* WAC 173-460-070.

NEDC notes that the TAP modeling already undertaken by Tesoro is flawed because it applied rural dispersion coefficients for facility dispersion simulations. *See* Application at 5.1.4.2.2. This approach was incorrect. The Terminal is located approximately three miles from Interstate 5 in Vancouver, which slices directly through the center of the city. For both the EIS and the PSD application, this analysis should be re-done to incorporate an appropriate urban dispersion coefficient and to further account for emissions from mobile sources immediately on the property itself such as dockside vessels and trains in the unloading area. EFSEC should consider vessel cold-ironing as one alternative in the EIS to reduce these ambient air emission levels.

#### *Regional Air Quality*

Emissions of criteria pollutants will sizably increase as a result of this project due to fuel oil emissions from vessels, diesel emissions from trains, and emissions from onsite processes at the Terminal. Criteria pollutants tend to have regional as opposed to merely localized impacts. For example, particulate matter, at minimum, tends to impact areas within an airshed, depending on the size and mass of the PM. Similarly, ozone caused by ozone-forming pollutants such as NO<sub>x</sub> and VOCs can traverse hundreds or even thousands of miles. For this reason, even though emissions from trains, vessels, and the terminal will often occur in different locations, NEDC nonetheless describes these impacts together because they all will impact similar areas or regions.

First, EFSEC should account for fuel oil emissions from ocean-going ships calling at the Port, one of which is expected to dock at the Terminal each day. These ships are extraordinarily high emitters of criteria pollutants, especially NO<sub>x</sub>, but also SO<sub>x</sub>, CO, and PM, and will emit substantially more criteria pollutants than the terminal itself. For example, the county of Santa Barbara, California, notes that more than half of its ambient NO<sub>x</sub> originates from vessels. *See* Exhibit 1. The Port of Los Angeles has also calculated detailed emission factors for various ships, including ocean-going ships, and has concluded that the main engine of a typical ocean-going ship emits 1,742 tpy NO<sub>x</sub>, 469 tpy SO<sub>x</sub>, 263 tpy CO, and 87 tpy PM. *See* Port of Los Angeles, Inventory of Air Emissions (July 2012), page 52 (attached hereto as Exhibit 6).

EFSEC should ensure that it accounts for the actual fuel(s) that will be used by these ships, noting that fuel standards are changing in 2016 and 2020 due to operation of the North American Emission Control Area. Because criteria pollutants can travel great distances, EFSEC should include ship emissions originating up to 200 nautical miles from the coastline in its analysis. Because dockside emissions from ocean-going vessels

could be largely or completely eliminated through cold-ironing (i.e., providing shore power to ships), EFSEC should include this option as a potential mitigation measure in its analysis, noting the type reduction of pollutants this option would facilitate along with the cost.

Similarly, EFSEC should quantify criteria pollutant emissions from escort vessels, such as tug and pilot boats, which will occur due to the construction of the Terminal. These ships also can emit a significant quantity of air pollutants. Detailed emission factors are available both through EPA and the Port of Los Angeles report cited above.

The EIS should examine the direct adverse effects of increased carcinogenic diesel emissions due to increased locomotive traffic. The EIS should examine the reasonably foreseeable air emissions from the operation and maintenance of the railways. These emissions are a serious concern for people living close to train tracks, which increases a person's exposure to diesel particulate matter to a level comparable to exposures in industrial settings. Thus, the EIS should consider the detrimental health effects that people living near the tracks will experience as a result of increased diesel particulate matter in the air.

The EIS should consider emissions from the facility itself, which have already been projected by Tesoro in its JARPA application, together with those from ships and trains traveling to and from the facility.

Most importantly, train and vessel trips resulting from the other fossil fuel transport facilities should be considered as cumulative impacts in this EIS. Because ships in particular are such high emitters of pollutants and trains repeatedly traverse the same locations, this analysis is essential to ensure that no violation of PSD increments NAAQS, or air quality related values (AQRVs) will occur and, on a practical level, to ensure that public health impacts of this many additional ships and trains are appropriately accounted for. These impacts should be converted into a quantifiable health risk analysis, noting especially any increased risk of mortality associated with this pollution. This quantification is important given that researchers estimate over 200,000 Americans die from air pollution every year. *See Caiazzo et al, Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005, 79 Atmospheric Environment, 198-208 (Nov. 2013) (attached hereto as Exhibit 7).*

Carcinogenic diesel emissions from the increase in marine vessel and towboat traffic will have a direct adverse effect on air quality. The Terminal will transport crude oil onto marine vessels at the project site. These vessels have the capacity to create significant diesel emissions, both in transit and while docked. EFSEC should examine the reasonably foreseeable air emissions from the operation and maintenance of the vessels along with any necessary support vessels such as tugs, pilots, and other escort vessels. These emissions should be accounted for within the North American Emissions Control Area (i.e. roughly to a distance of 200 nautical miles from the Pacific Coast), as ship emissions facilitated by the Terminal are most likely to impact overland air quality management districts within this vicinity. The analysis should include an investigation of

the types of fuel being used, as well as the efficiency of the technology used to operate the vessels.

EFSEC should incorporate reasonable mitigation measures such as cold-ironing, the use of effective scrubbing technology on ships, and the use of cleaner fuels by incoming cargo ships in the EIS. These mitigation measures should be compared against the baseline of ambient air quality that would be expected to occur but for these mitigation measures.

#### *Hazardous air pollutants*

EFSEC should evaluate the direct effects of hazardous air pollutants (HAPs) in the EIS. Specifically, the EIS should address the HAPs likely to be emitted from diesel emissions from trains, marine vessels, and any trucks associated with the construction or operation of the Terminal. The EIS should also address that HAPs can and will vary depending on the type of bulk commodity being exported. A list of potential export commodities that contain hazardous materials should be included in the EIS and the impact of fugitive emissions of each type of commodity identified should be evaluated. For example, coal contains mercury, a listed HAP.

#### *Human health*

Nitrogen oxide (NO<sub>x</sub>) and nitrous oxide (N<sub>2</sub>O) emissions from increased maritime traffic will have significant ozone-related effects. Commercial maritime shipping significantly contributes to NO<sub>x</sub> emissions. NO<sub>x</sub> emissions cause the formation of ground-level ozone, which reduces visibility and presents very serious human health risks. Also, N<sub>2</sub>O is the leading cause of depletion of stratospheric ozone. See Ravishankara, et al., *Nitrous Oxide (N<sub>2</sub>O): The Dominant Ozone-Depleting Substance Emitted in the 21st Century*, 326 *Science* 123, 123–125 (2009) (attached hereto as Exhibit 8). EFSEC should address the effects of NO<sub>x</sub> emissions from shipping and construction activities on ground level ozone and stratospheric ozone. Moreover, the EIS should model NO<sub>x</sub> emissions and ground level ozone concentrations for the area.

Additional trains mean an increase in localized air pollutants along rail corridors. These localized impacts are extremely important for EFSEC to take into account because the same communities will be subjected to these emissions repeatedly, multiple times per day. Specifically, EFSEC should quantify the increased health risk on communities within a half mile of the train corridor that will be used by trains traveling to and from the Terminal. This risk should be expressed in terms of increased mortality risk due to carcinogenic and other health-related impacts. This analysis should account for the cumulative impacts of trains traveling to and from the Terminal along with trains traveling to and from the other fossil fuel transport projects identified in Section II. And this analysis should identify the impact of these emissions on at-risk members of the population, especially young children.

An example may highlight the importance of analyzing the cumulative impacts of

trains on communities near rail corridors. Every train associated with these projects must travel through a “rail funnel” in and around Spokane. Each train emits approximately the same quantity of air pollutants as 35 trucks. With forty trains traveling through Spokane per day, this will result in diesel emissions equivalent to 1400 trucks per day, or approximately one truck per minute, repeatedly traveling through the same heavily-populated area.

A major concern is the exposure of vulnerable populations to these emissions. Exposure to diesel exhaust from train traffic has been connected to asthma and cardiovascular problems. Children’s lungs are the most vulnerable, and if they are exposed to air pollution they can suffer from decreased lung function for the rest of their lives. Diesel pollution can irritate those who are susceptible to respiratory illness. Many of the pollutants found in diesel emissions will worsen the effects of respiratory illnesses, such as asthma. EFSEC EIS should carefully consider any and all health effects faced by local populations as a result of diesel emissions from locomotive engines.

#### *Visibility*

Fugitive emissions from the proposed site and locomotive traffic will have a direct adverse impact on visibility in the region, and in particular on the Columbia River Gorge. Haze-forming pollutants, including nitrogen oxides, sulfur dioxide, and particulate matter, pose a serious risk to the visual experience of these majestic natural areas that have come to define the Pacific Northwest.

With the many additional ships operating in Washington’s waterways and coastal areas, impacts to visibility and regional haze must also be accounted for. As noted above, one individual ship, on average, emits 1,742 tpy NO<sub>x</sub>. *See* Exhibit 6. This is approximately 17% of PGE’s coal-fired Boardman plant, which is the largest emitter of ozone-forming pollutants in Oregon and has by far the largest impact on visibility in that state. Just five or six additional large ocean-going vessels operating off of Washington’s coastline could have a similar impact on visibility. Given this aesthetic impact to hundreds of thousands, or potentially millions, of residents and visitors, EFSEC should address these cumulative adverse impacts on visibility and aesthetics.

There are numerous Class 1 areas in Oregon and Washington, each of which is under a federal mandate that visibility should be improved to “natural conditions” by 2064 and that reasonable further progress must be made toward this goal. *See* 40 C.F.R. § 41.308(d)(1) (2013). Given the substantial increase in vessel traffic in particular, EFSEC should initiate a consultation process with the federal land managers at Class I areas, including Mount Hood, Mount Adams, Goat Rocks, Mount Ranier and the Columbia River Gorge. Those Federal Land Managers may require an additional air quality related values analysis to model visibility impacts on those areas. *See* Federal Land Managers’ Air Quality Related Values Work Group (FLAG) Phase I Report—Revised (2010) (attached hereto as Exhibit 9).

#### *Global greenhouse gas emissions*



Carbon dioxide (CO<sub>2</sub>) and N<sub>2</sub>O emissions from increased maritime traffic and the burning of crude oil will have significant ozone-related effects and greenhouse gas effects. The EIS should include an accounting of greenhouse gas emissions associated with all aspects of the project, including but not limited to: (1) pre-construction; (2) construction; (3) operation; (4) maintenance; (5) decommissioning; (6) increased rail and ship transportation, reasonably expected to occur due to operation of the Terminal; (7) increased oil combustion, reasonably expected to occur due to operation of this Terminal; and (8) increased oil extraction, reasonably expected to occur due to operation of this export terminal. Some of these impacts may be viewed as direct or indirect impacts. Items (1)-(5) should address both stationary and mobile emissions sources. Items (7)-(8) relate specifically to oil. All of the above sources of emissions should be estimated over the life of the project and in cumulative fashion.

Most importantly, the impact of combusting the crude oil proposed to be transported through the Terminal must be accounted for in the EIS. This Terminal stands to become the largest crude oil transfer terminal in the Pacific Northwest, facilitating the transfer and eventual combustion of 360,000 barrels per day of crude oil at full build-out. Given the extremely high volume of carbon-emitting fuels that will be transported through this facility, EFSEC should quantify the global warming potential of the combustion of this fuel. This analysis has recent precedent based on Ecology's SEPA scoping analysis for the Gateway Pacific Terminal.

### *Climate Change*

Construction of the Terminal will result in numerous sources negatively affecting regional air quality and global climate change. Tesoro acknowledges that "most scientists concur that anthropogenic global emissions of greenhouse gases are affecting climate, [but] there are no analytical tools or established procedures for evaluating climate impacts from individual projects." See Application at 3-256. This statement flies in the face of what our federal government has found achievable under the analogous statute, the National Environmental Policy Act (NEPA).

In 2010, the Council on Environmental Quality (CEQ) promulgated draft guidance on the ways in which Federal agencies can improve consideration of the effects of greenhouse gas emissions and climate change in their evaluation of specific project proposals under NEPA. See February 18, 2010, CEQ Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (attached hereto as Exhibit 10). This guidance recognizes climate change is a global problem, and directs agencies to focus on aspects of climate change that may lead to changes in the impacts, sustainability, vulnerability, and design of a proposed action and alternative courses of action. It notes that agencies can use the NEPA process to reduce vulnerability to climate change impacts, adapt to changes in our environment, and mitigate the impacts of actions that are exacerbated (or that exacerbate) climate change.

During his June 29, 2013 weekly address, President Obama called on all

Americans to speak up about climate change in their communities and remind their elected officials that we must take action to protect our future generations from the ravages of climate change. Tesoro's claim that climate change simply cannot be evaluated on an individual project level blatantly ignores existing guidance for analogous environmental assessments and President Obama's call for elected officials to address climate change in meaningful ways. Tesoro's approach also turns a blind eye to the inevitable climate change impacts that will result from the Terminal it proposes for the transportation of massive amounts of crude oil. This crude oil when then be burned in the United States, and once refined, abroad. At bottom, EFSEC should address the Terminal's impacts on climate change from the various emissions related to the project as well as the induced demand that this crude oil supply will create domestically and abroad.

### **Conclusion**

NEDC urges EFSEC to prepare an EIS that focuses not only on the impacts from the construction and operation of Tesoro's proposed Terminal at the facility location itself, but also the impacts of this Terminal when considered in the cumulative with the numerous other fossil fuel transport projects proposed for the Pacific Northwest. Failure to consider the cumulative impacts of authorizing these projects would ignore the very real environmental impacts that stand to follow. Indeed, as a council with representatives from a wide range of state agencies, EFSEC is uniquely positioned with the opportunity to conduct a comprehensive review of the cumulative impacts of these projects. Such impacts must be fully understood before EFSEC can make a rational recommendation to the Governor regarding the certification of the Terminal.

Sincerely,

Marla Nelson  
Legal Fellow

JJ England  
Project Group Coordinator

# **The Need to Reduce Marine Shipping Emissions: A Santa Barbara County Case Study**

**Paper # 70055**

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## **ABSTRACT**

Marine shipping, the largest unregulated source of oxides of nitrogen (NO<sub>x</sub>) emissions, represents a significant long-term obstacle to achieving ozone standards in coastal areas, as documented in the example of Santa Barbara County in California.

According to the Santa Barbara County Air Pollution Control District (APCD) 2001 Clean Air Plan, 1999 base year NO<sub>x</sub> emissions from marine vessels were more than those from all on-road motor vehicles, and comprised just over a third of the total NO<sub>x</sub> emissions inventory. By 2015, the Plan projects that NO<sub>x</sub> emissions from ships will be almost five times greater than those from on-road motor vehicles, and comprise more than 60 percent of the total NO<sub>x</sub> emissions inventory.

The projected increase in marine shipping emissions essentially negates all the NO<sub>x</sub> emissions reductions expected to occur onshore, and brings the 2015 inventory to levels close to those experienced in 1999, the year Santa Barbara County attained the federal one-hour ozone standard. This jeopardizes the county's ability to maintain the ozone standard. Achieving reductions in marine shipping emissions is critically important for the county's long-term air quality, especially as it is increasingly difficult to obtain cost-effective onshore emission reductions.

Since more than ninety percent of the NOx emissions from vessels transiting offshore the county fly foreign flags, and the existing fleet has a slow rate of turnover, the task of reducing marine shipping emissions is a challenging one. While regulatory approaches may achieve NOx emission reductions over the long term (10-30 years), incentive programs and partnerships to reduce emissions from existing vessels are essential for continued air quality improvements in the near term (1-10 years).

This paper provides information about the Santa Barbara County emissions inventories, places this information in a national and international context, outlines the existing regulatory framework, identifies opportunities for near-term cost-effective emission reductions, and highlights the need for incentives and partnerships to gain momentum in reducing marine shipping emissions through demonstration programs. Much of what we have learned and will present is thanks to the work of others who have been researching this issue for many years. And while this paper presents Santa Barbara County specific data, we believe that the information is germane to other areas of the nation and internationally.

## **INTRODUCTION**

There is a growing awareness internationally of the significance of shipping emissions. Ships are increasing in number, size, carrying capacity and speed, while fuel use is increasing proportionally.<sup>1,2,3,4</sup> In addition, residual heavy fuel oil – the most common fuel used in large ship engines – is decreasing in quality, while a greater number of engines are being designed to use this lower-quality fuel.<sup>5</sup>

There is also an increasing awareness of the impacts of shipping emissions on onshore air quality. An estimated 85 percent of international shipping traffic occurs in the northern hemisphere, and 70 percent of that is within 400 km (240 miles) of land.<sup>6</sup> Much of the shipping activity and associated emissions occur near major urban areas, many of which are already struggling with air quality problems.

There is a range of estimates for NOx emissions from marine shipping activities. The United States Environmental Protection Agency (USEPA) estimates that approximately 4.4 percent of total NOx emissions in the United States come from compression ignition marine engines.<sup>7</sup> One study estimates that NOx emissions from US ships are 127,000 tons/year (inland rivers) and 317,000 tons/year (ocean-going).<sup>8</sup> According to a study conducted for USEPA in 1991, ocean-going marine vessel emissions contributed more than 11 tons per day of NOx in New York/New Jersey and 19 tons per day of NOx in the Houston/Galveston area.<sup>9</sup> A recent estimate of year 2000 NOx emissions from ocean-going vessels in the Vancouver, B.C. region is close to 15 tons per day of NOx.<sup>10</sup> NOx emissions from ocean-going ships in the South Coast Air Basin for the year 2000 are estimated at 35 tons per day.<sup>11</sup>

Santa Barbara County is situated on the west coast of California between San Luis Obispo County to the north and Ventura County to the east. Even though Santa Barbara County does not have a port, more than 33 tons per day of NOx were produced by marine

shipping activities offshore the county in 2000 – a figure more comparable to those estimated for Los Angeles and San Francisco. This is due to several factors. There is a very high volume of vessels transiting along the Santa Barbara County coastline, and most of these vessels use large, higher polluting, two-stroke engines. The county also has 130 miles of coastline, so these vessels are traversing a relatively long distance. In addition, much of the emissions associated with shipping activities occur between 10 to 20 miles from shore, as ships traverse the California coastline and/or use great circle routes throughout the Pacific Rim.

Santa Barbara County is currently classified by USEPA as a “serious” nonattainment area for the federal 1-hour ozone standard but has applied for redesignation as an attainment area. APCD developed a 2001 Clean Air Plan to support the application for redesignation, and to demonstrate continued attainment of the 1-hour standard for at least 10 years after redesignation.<sup>12</sup>

Based on accepted methodologies for estimating marine vessel emissions, primarily as detailed in the 1999 ARCADIS emissions inventory report,<sup>13</sup> inventories developed for Santa Barbara County’s 2001 Clean Air Plan showed that marine shipping emissions represented approximately one-third of estimated NOx emissions for 1999. Marine shipping was thus the single largest source of NOx emissions, contributing an amount comparable to the NOx emissions from all trucks, cars, and buses operating onshore. In the 2015 emissions forecast, marine shipping emissions represent more than 60 percent of NOx emissions and are almost five times greater than those from on-road motor vehicles. The dramatic increase in NOx emissions from this source through the planning horizon essentially negates anticipated NOx reductions onshore from local, state and federal air programs. This also jeopardizes APCD’s ability to show continued attainment of the federal 1-hour standard through 2015.

Data collected to calculate marine shipping emissions offshore Santa Barbara County during 2000 reveal several specific points of interest:<sup>14</sup>

- 6,424 total transits occurred offshore the county (an average of almost 18 transits every day of the year)
- 1,363 different individual vessels transited the coastline
- 91 percent of the emissions were from foreign-flagged vessels
- 10 percent of the individual vessels contributed 50% of the emissions
- 44 of the vessels each emitted more than 50 tons per year of NOx.

In Santa Barbara, we have assigned the moniker “frequent flyers” to those vessels that create the most emissions each year, due to a combination of the emissions characteristics of their engines, the fuel they burn, and the number of transits they make each year. One very interesting feature is that 10 percent of the ships make up 50 percent of the marine shipping emissions offshore Santa Barbara. The fact that a relatively small number of ships contributes a large percentage of emissions provides a unique opportunity to obtain significant emission reductions with retrofit technologies.

Efforts to regulate the emissions from marine shipping have been largely ineffective to date. More stringent regulations, and a more intensive focus on international implementation, are needed to encourage the development of engines that will be substantially cleaner than those already on the market today.

While regulatory efforts are of critical importance to reducing emissions in the long term, near-term strategies must also be pursued. The California Air Resources Board (CARB) has initiated the Maritime Working Group to provide a forum for discussion of air quality issues and concerns pertaining to maritime activities in California. This group draws upon a large group of interested parties including USEPA, local California air districts, port representatives, ship owner/operators, the Maritime Administration, engine manufacturers and emission control technology providers. Preliminary estimates indicate that implementing retrofit emission control technologies on existing ocean-going vessels could provide very cost-effective emission reductions relative to those already implemented onshore. The status of current efforts to reduce emissions from the existing vessels, and the need to continue to build partnerships to address this large source of emissions, will be discussed in this paper.

## **MARINE SHIPPING EMISSIONS INVENTORY**

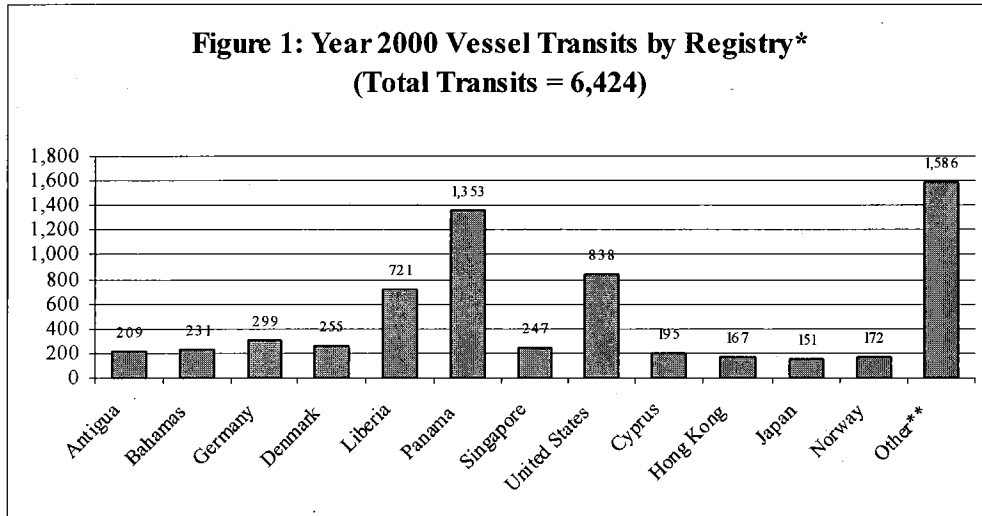
The NOx emissions from marine shipping activities offshore Santa Barbara County are largely due to three principal factors:

- There is a high volume of transits along the Santa Barbara County coastline.
- The majority of the vessels use large, higher polluting, two-stroke engines.
- The county has 130 miles of coastline, so these vessels are traversing a relative long distance. Much of this travel is through the Santa Barbara Channel, which is only 10-20 miles from the shore.

A detailed, ship-by-ship review was used to estimate emissions from ships transiting offshore Santa Barbara. The inventory process gathered information on ship names, arrival and departure dates and direction, ship type (e.g., container, bulk carrier), flag, dead-weight tonnage, and average cruise speed. Port Hueneme<sup>15</sup> and the Marine Exchange of Los Angeles - Long Beach Harbor, Inc.<sup>16</sup> were the main sources of these data.

All ships that arrived from the north to Port Hueneme, the Port of Los Angeles or the Port of Long Beach, or departed to the north from any of these ports, were included in the estimates. Duplicates were eliminated. The average cruising horsepower for each ship's main engine(s) was determined using methods detailed in the ARCADIS report, or by consulting the Lloyd's Registry of Ships.<sup>17</sup> Emissions from auxiliary engines were included. We determined the Santa Barbara coastline transit time for each ship, and applied NOx emission factors from the ARCADIS report. The factors used were based on ARCADIS' analysis of NOx emissions limits finalized in late 1997 at the International Maritime Organization, and considered emissions testing of ships performed as part of Lloyd's Marine Exhaust Emissions Research Programme.<sup>18</sup>

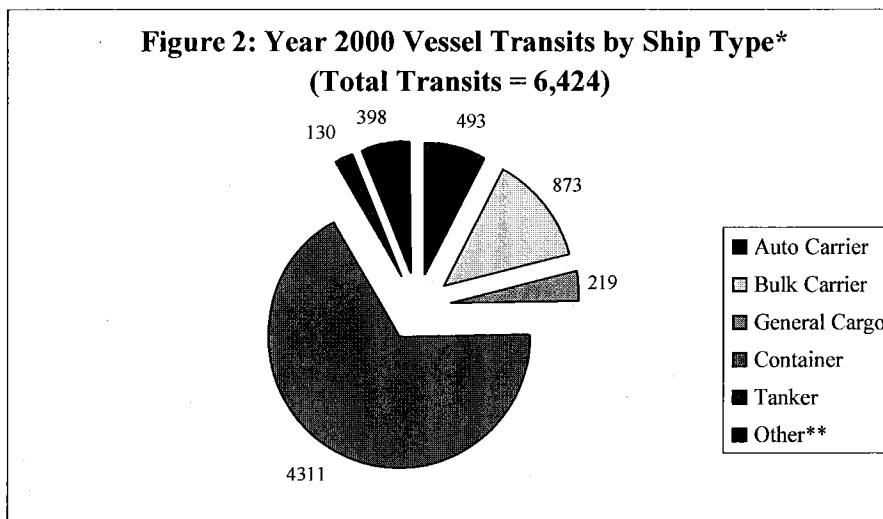
Figure 1 presents a summary of the number of transits along Santa Barbara during 2000 by vessel registry.



\* 2000 Marine Exchange Data – Ports of Los Angeles/Long Beach.  
 \*\* Comprised of 37 other countries.

During the year 2000, there were 6,424 vessel transits along Santa Barbara County from 49 different countries. The country with the greatest number of vessel transits was Panama (1,353 transits), followed by the United States (838 transits), and Liberia (721 transits). More than 87 percent of the total transits along this coastline were by foreign-flagged vessels.

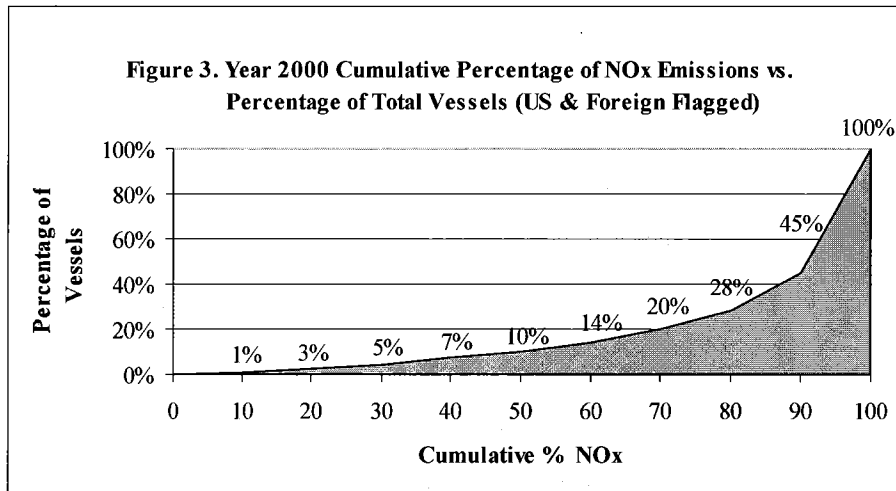
Figure 2 itemizes the types of vessels that traversed our coastline during 2000.



\* 2000 Marine Exchange Data – Ports of Los Angeles/Long Beach.  
 \*\* Other vessels include Passenger, Reefer, and Ro-Ro vessels.

Figure 2 shows that 67 percent of the 6,424 traverses along our coastline in the year 2000 were by container vessels, followed by bulk carriers (14 percent), auto carriers (8 percent), general cargo vessels (3 percent), and tankers (2 percent).

Figure 3 shows a comparison of the cumulative percentage of NOx emissions versus the percentage of vessels for 2000 offshore Santa Barbara.



Source: 2000 Marine Exchange Data, Ports of Los Angeles/Long Beach

This figure shows that by focusing our retrofit efforts on only 10 percent of the vessels that transit along our coastline, we can target 50 percent of the NOx emissions associated with shipping activities impacting our air quality.

Table 1 presents the maximum and average horsepower ratings by vessel type for those vessels that traversed our coastline during 2001.

**Table 1: Maximum and Average Horsepower Ratings by Vessel Type<sup>19</sup>**

Vessel Type	Maximum Horsepower	Average Horsepower
Auto Carrier	20,940	10,430
Bulk Carrier	20,874	7,742
Container Ship	109,600	32,322
General Cargo	57,089	7,738
Passenger	62,370	30,913
Reefer	15,079	11,267
Ro-Ro	26,921	11,056
Tanker	29,422	8,778

Table 1 shows that the container vessel fleet averaged 32,000 horsepower with a maximum horsepower rating of 109,000. General cargo and passenger vessels had maximum horsepower ratings around 60,000 with the remaining vessels maximum horsepower ratings ranging from 20,000 to 30,000.



The combination of the large number of vessel transits along our 130-mile coastline and the high percentage of container vessels that have the highest average and maximum horsepower ratings (equating to higher emissions) resulted in more than 33 tons per day of NOx emissions in the area in 2000. Foreign-flagged vessels accounted for 87 percent of the total transits, but accounted for 91 percent of the total NOx emissions, since these vessels are predominantly large, higher emission container ships.

## **SHIPPING EMISSIONS IN THE CONTEXT OF SANTA BARBARA COUNTY AIR QUALITY PLANNING**

APCD has prepared several air quality plans for Santa Barbara County to comply with state and federal ozone standards, and offshore emissions have been considered significant in these documents for some time. The first two plans, the 1979 Air Quality Attainment Plan and the 1982 update were prepared in response to mandates established by the federal Clean Air Act Amendments of 1977. The 1982 update predicted attainment of the federal ozone standard by 1984, but acknowledged that the county's ability to attain the federal ozone standard was uncertain because pollution generated offshore was not considered.

In the 1994 Clean Air Plan, photochemical air quality modeling was performed for the region. This modeling showed that emissions from marine shipping activities contributed to ozone formation, and found that Santa Barbara County would attain the federal 1-hour ozone standard by the mandated 1996 attainment date but for the emissions generated off the coast by marine shipping activities.<sup>20</sup>

Santa Barbara County was unable to attain the federal 1-hour ozone standard by the 1996 attainment deadline, and was reclassified in 1997 as a "serious" nonattainment area by the USEPA. The new classification required additional regulatory requirements and the development of another air quality plan to show attainment by a new deadline of November 15, 1999.

Subsequent to the development and submission of the next air quality plan (1998 Clean Air Plan) required to comply with the "serious" nonattainment area mandates, air quality monitoring data showed that the county met the federal 1-hour ozone standard by the 1999 attainment deadline. This prompted the development of a "Maintenance Plan," which became the 2001 Clean Air Plan.

The Maintenance Plan required APCD to determine an "attainment inventory" for Santa Barbara County against which to compare future predicted emissions through 2015. Since the federal 1-hour ozone standard was attained from 1997 through 1999, emission inventories were developed for 1999 for both reactive organic compounds (ROC) and NOx.

The attainment inventory methodology assumes that the emission levels experienced in Santa Barbara County during 1999 are adequate to keep measured ozone concentrations below the federal 1-hour ozone standard. The maintenance demonstration must show that

predicted future year emission levels through 2015 are below the attainment inventory established for 1999.

## **2001 Clean Air Plan Emission Inventory**

This section describes the baseline emission inventory used in the development of the 2001 Clean Air Plan. The emission inventory accounts for the types and amounts of pollutants emitted from a wide variety of sources, including on-road motor vehicles and other mobile sources, fuel combustion at industrial facilities, solvent and surface coating usage, consumer product usage, and emissions from natural sources. Emission inventories are used to describe and compare contributions from air pollution sources, evaluate control measures, schedule rule adoptions, forecast future pollution, and demonstrate attainment and maintenance of air quality standards.

### ***Emission Inventory Development***

The emission inventory is organized in a three-tier hierarchy that categorizes all air pollution sources. The first tier of this hierarchy contains four divisions:

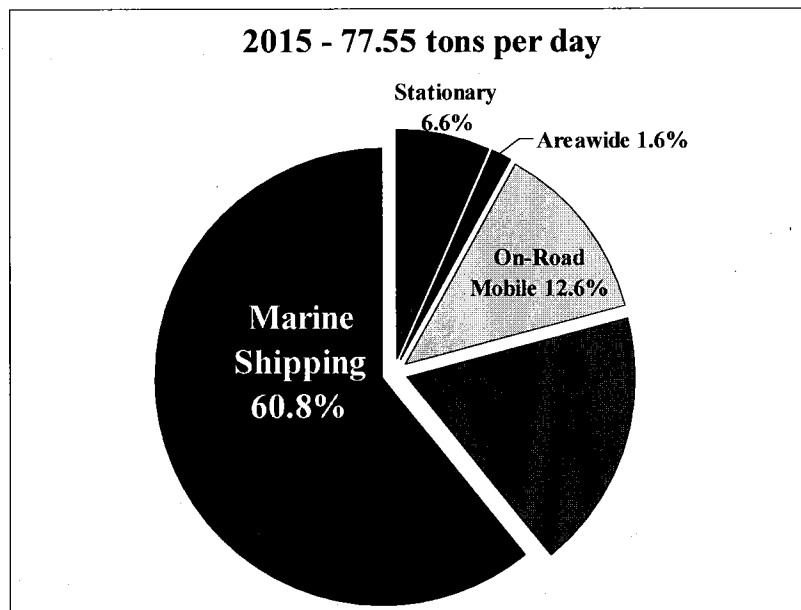
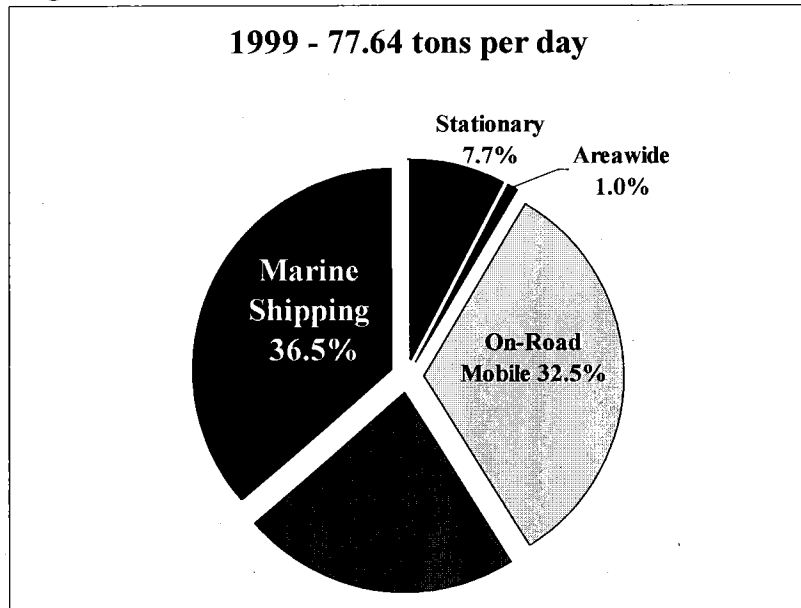
- Stationary sources (e.g., internal combustion engines, boilers, mineral processing)
- Area-Wide sources (e.g., consumer products, paints and solvents)
- Mobile sources (e.g., cars, trucks, planes, trains, ships)
- Natural sources (e.g., vegetation, oil and gas seeps).

In the second tier, each of the four divisions is sub-divided into major source categories. The third tier divides the major source categories into summary categories. For the purposes of this paper, we present NO<sub>x</sub> emissions by first tier emission divisions for stationary, area-wide, and mobile sources both onshore and offshore of Santa Barbara County, with marine shipping emissions distinguished from the “other mobile” sources. Natural sources are not included in this paper as those emissions are not human-generated.

### ***1999 and 2015 Emission Inventories***

Once the 1999 emission inventory was developed using the most current data, it was forecast out to 2015 using both growth and control assumptions. Growth assumptions include changes in population, employment, vehicle miles traveled, agricultural acres in use, and many others. Control assumptions predict the expected emission controls that will result from local, state and federal air programs. The combination of both growth and control data assumptions are applied to the 1999 inventory in order to develop the 2015 forecast. Figure 4 presents the emission inventories developed for 1999 and forecast for 2015.

**Figure 4: Santa Barbara County NOx Emissions Comparison**

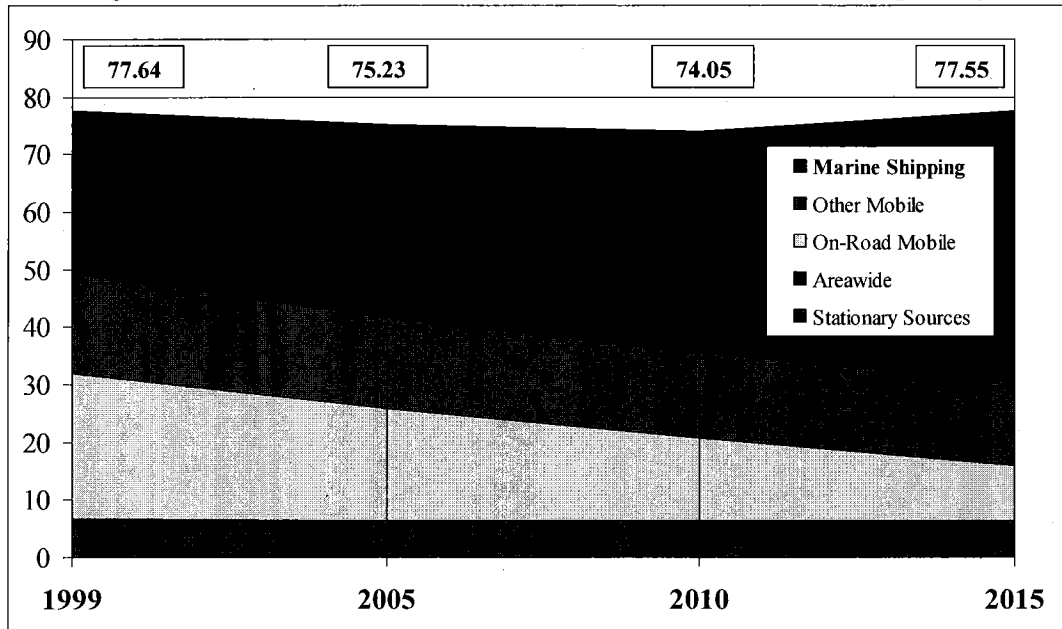


As seen in Figure 4, marine shipping activities contribute more NOx emissions to Santa Barbara County than all the cars, trucks, and buses operating onshore, and represent 36 percent of the total NOx emissions in 1999. The figure also shows that marine shipping emits more NOx than all the “other mobile” sources in the county, including trains, planes, off-road vehicles, farm and construction equipment and many other sources. In addition, Figure 4 shows that the anticipated growth of marine shipping emissions results

in a NOx emission contribution of 60 percent of the total inventory by 2015, almost five times the emissions associated with on-road motor vehicles.

Figure 5 presents the forecast for NOx emissions from 1999 through 2015.

**Figure 5: Santa Barbara County Forecast NOx Emissions (tons per day)**



This figure shows that total NOx emissions decline slightly from 1999 through 2010 and then increase through 2015 to levels that approach those experienced during 1999. This figure also documents that the projected increase in marine shipping emissions essentially negates all the NOx emissions reductions expected to occur onshore from local, state and federal air programs.

## **IMPLICATIONS FOR MEETING AIR QUALITY STANDARDS**

Since forecasted NOx emission levels in 2015 are approaching those experienced in 1999, the county's maintenance demonstration to USEPA comes under increasing scrutiny. If marine shipping emissions continue at the projected rates without any additional controls, Santa Barbara County's long-term trend of improving air quality and ability to maintain attainment of standards could be jeopardized.

Marine shipping activities are the most significant source of emissions that impact our local air quality. And the fact that the growth of marine shipping emissions is counteracting the emission reductions achieved onshore via regulatory controls is of greatest concern. Local, state and federal air programs, in existence for more than 30 years, have resulted in significant emission reductions to date and are anticipated to provide additional emission reductions into the future, as Figure 5 illustrates.

However, the issue at hand is that the majority of the cost-effective emission controls available onshore have been implemented or are already scheduled for implementation. Additional onshore controls will be difficult to obtain and expensive to implement. Reducing emissions from marine shipping activities is of critical importance to the long-term air quality of Santa Barbara County.

## **REGULATORY FRAMEWORK**

Although the shipping industry is highly regulated in some environmental areas such as sewage and waste, and ballast water, regulatory efforts to date to reduce air emissions from marine shipping have not kept pace with emission reduction programs onshore. MARPOL 73/78 is the International Convention for the Prevention of Pollution from Ships. Annex VI, adopted by the Parties to MARPOL in 1997, has NO<sub>x</sub> requirements for the Category 3 engines typically used in ocean-going vessels, beginning January 1, 2000. This Annex has not been ratified by the required minimum of 15 member countries representing 50 percent of the world's merchant shipping.

However, since the NO<sub>x</sub> emission standards contained in Annex VI are retroactive to January 1, 2000 once the Annex is ratified, virtually all ship engine manufacturers already build engines that meet these standards. No additional emission reductions from ratification of Annex VI are expected, although ratification does represent a first step toward the implementation of additional technology-forcing standards and requirements in the future.

The USEPA Final Rule on Control of Air Pollution from New Marine Compression-Ignition Engines at or Above 37 kW (50 hp), effective 1/28/2000, applies to Category 1 and 2 engines, and recommends that the IMO adopt regulations for Category 3 engines that are more stringent than the Annex VI requirements. In 2000, the Bluewater Network settled a lawsuit against the USEPA for failure to establish standards for Category 3 engines. The settlement required USEPA to establish standards for these engines by January 2003. The resultant regulation recently promulgated by USEPA establishes standards that are no more stringent than those established in Annex VI.<sup>21</sup>

CARB is currently developing proposed emission control strategies for commercial marine vessels and ports that are expected to become part of the South Coast Air Quality Management District's State Implementation Plan.<sup>22</sup> These strategies will provide emission reductions statewide. Measures under consideration include:

- setting more stringent emission standards for new harbor craft and ocean-going ships;
- developing ways for existing harbor craft fleet to use cleaner engines and fuels;
- designing strategies to clean up the existing ocean-going fleet; and
- taking steps to reduce land-based emissions at ports.

Action on the state's proposed measures is expected between 2003 and 2005, with implementation in the 2003-2010 timeframe.

Even in the best-case scenario—if new regulations are adopted by CARB and USEPA, and the IMO moves to strengthen standards under Annex VI— it could be many years before significant emission reductions are realized through the regulatory process, particularly for the larger ocean-going vessels that traverse the Santa Barbara coastline. Most of the USEPA and IMO regulations only apply to newly manufactured vessels. Since the turnover of vessels is very slow, coastal and port areas will be living with pollution from existing vessels for many years. Therefore, it is imperative to develop partnerships and incentive programs like those being evaluated by CARB, and to initiate demonstration projects to reduce emissions from the existing vessels that transit our area.

## **TECHNOLOGIES**

Until recently, many have viewed shipping industry emissions as fairly minor, of lesser impact to onshore air quality, and difficult, if not impossible, to control. Over time, these views have changed in recognition of the facts that a significant percentage of total man-made emissions are from ships, these emissions have both near-shore and regional air quality impacts, and feasible technologies are available at reasonable costs to clean up ship emissions.<sup>23</sup>

Most NO<sub>x</sub> emissions in exhaust gases are produced due to high temperatures during the combustion process. There are primary methods to reduce NO<sub>x</sub> formed during combustion, most of which attempt to reduce the maximum temperatures during combustion, as well as secondary methods that treat the post-combustion exhaust gas stream to reduce NO<sub>x</sub>. Examples of each method are shown below:

### Primary:

- Engine related: injection timing retard, higher compression ratios, increased charge air
- Fuel injection: nozzle changes and injection rate shaping
- Addition of water: fuel-water emulsion, direct water injection, pre-treatment of combustion air (humid air motor or combustion air saturation systems)
- Exhaust gas recirculation

### Secondary:

- Selective catalytic reduction (SCR) mixes exhaust gas with ammonia or urea before it passes through a catalytic bed
- Electrostatic precipitators to reduce PM emissions
- Oxidation catalysts to reduce CO and HC
- Low-sulfur content fuel that allows catalytic converters

In addition to the noted control technologies, operational limits that reduce emissions can also be implemented. The voluntary speed reduction program that limits the speed of ships entering the Ports of Los Angeles and Long Beach is an example of setting operational limits to achieve emission reductions.

Both primary and secondary control technologies are applied most easily to a specific ship during the ship's design stage. Application of these technologies as retrofit controls (i.e., not as part of a ship's original design) has potential downsides, including: high unit cost; ship downtime for installation of the new controls; increased fuel use (typical for timing retard and water injection or emulsion systems); the need for large amounts of deionized water production and storage (typical for water injection, emulsion, and humid air motor systems); potential engine damage from the control system (possible with exhaust gas recirculation that routes exhaust gas particulate matter through the charge air system); and lack of space on the existing ship (e.g., installing SCRs on 2-stroke engines).

In addition, significant modifications to an engine not previously subject to the NOx Technical Code of MARPOL 73/78 of Annex VI may make the engine subject to the Annex VI requirement to demonstrate that the modifications did not cause an increase in emissions. This means that pre- and post-modification emissions tests may be required, even for engines not previously subject to Annex VI requirements.

Table 2 presents a summary of various retrofit control technologies that could be installed on large vessel engines.<sup>24</sup>

**Table 2: Performance Attributes Summary of NOx Control Technologies for Existing Engines.**

Control Technology	Nominal NOx Reduction (%)	Nominal Reduction in PM and other Pollutants (%)	Nominal Increased Fuel Use (%)	Net Present Value (\$)	Global Cost Effectiveness (\$/ton NOx)
Aftercooler upgrade	10	-1	2	\$184,000	\$620
Engine derating	14	-10	4	\$386,000	\$933
Fuel pressure increase	14	-21	2	\$220,000	\$523
Injector upgrade	16	-21	2	\$192,000	\$410
Injection Timing Retard	19	-11	4	\$363,000	\$618
Water in combustion air	28	1	3	\$365,000	\$468
Exhaust gas recirculation	34	-51	0	\$16,900,000	\$16,377
Water/fuel emulsion	42	15	2	\$325,000	\$284
Selective catalytic reduction	81	0	0	\$475,000	\$227

As this table shows, a range of control technologies can be evaluated as retrofits to existing vessels in order to reduce NOx emissions, and these controls potentially carry a lower cost per ton of emission reduction than most typical onshore emission controls. In addition, focusing retrofit efforts on the "frequent flyer" vessels that create the most emissions will provide the most cost-effective emissions reduction projects.

A review of cost-effectiveness calculations for incentive programs,<sup>25</sup> generation of emission reduction credits,<sup>26</sup> and emission control measures<sup>27</sup> shows a range of cost from \$660 to more than \$40,000 per ton of NOx reduced. By way of comparison, the average cost per ton for industrial NOx emission reduction credits used in Santa Barbara County

from 1999 through 2003 was more than \$9,000, and the average cost per ton from California's Carl Moyer Program (Years 1 and 2) was \$5,000.

Comparatively, emission reduction programs for marine shipping applications have the potential to produce significant levels of emission reductions on a more cost-effective basis. This is due to the fact that onshore emission reduction programs have matured, while marine shipping emissions have been largely unregulated to date.

However, the cost-effective emission reductions from marine shipping require a large capital expenditure as indicated by the Net Present Value costs associated with the technologies identified in Table 2 that range from \$184,000 to several million dollars. A broad-based partnership/incentive approach will be necessary to support capital expenditures of this magnitude, and provide for the evaluation, implementation and verification of these technologies through demonstration programs. Once a technology or set of technologies is proven, additional funding partnerships and incentives will be needed to expand implementation programs to other existing vessels.

Table 2 also highlights the potential for increases in other pollutants (e.g., particulate matter, greenhouse gases) and decreased fuel efficiency. These trade-offs need to be clearly identified and minimized to the greatest extent feasible. For example, injection timing retard generally reduces NO<sub>x</sub> emissions, but increases PM, and increases fuel use with an associated increase in greenhouse gas emissions. A thorough review of each emissions reduction technology must be conducted for each application to avoid emission trade-offs that may be counter to broader clean air goals.

Fuel characteristics can also be modified to reduce pollution, primarily by reducing sulfur content, thereby reducing SO<sub>x</sub> emissions, and allowing the use of catalytic treatment of exhaust gases to reduce NO<sub>x</sub>. SO<sub>x</sub> emissions reduction is a major concern in much of Europe, due to the impacts of acid rain.<sup>28, 29</sup>

There is a tremendous opportunity to reduce both SO<sub>x</sub> and NO<sub>x</sub> emissions by reducing the sulfur content of fuels used in shipping. The current average sulfur content of heavy fuel oils used by large marine vessels is about 2.5% (25,000 ppm). The fuel sulfur content limits of the impending IMO Annex VI are set at 4.5% (45,000 ppm), with a 1.5% (15,000 ppm) limit for SO<sub>x</sub> Emissions Control Areas (SECA) such as the Baltic Sea. Upon application to IMO after Annex VI is implemented, other areas (e.g., coastal areas of the United States) may be declared SECA areas with the 1.5% sulfur limit. These sulfur content values contrast with the current California on-road diesel limit of 0.05% (500 ppm), especially as the sulfur content of typical on-road diesel fuel is usually well below this limit, generally in the 130-150 ppm range. Also, ultra low sulfur diesel (15 ppm sulfur) is now becoming available, and will soon be required on both urban buses and solid waste collection vehicles in California. This ultra low sulfur diesel requirement will also apply nationwide for on-road diesel fuel starting in 2007, so it is clear that there are opportunities to improve the quality of the fuels used by the shipping industry.



The above tables and information document the fact that many opportunities exist to achieve emission reductions from existing marine vessels. Steps towards implementation of a demonstration program targeting reductions from existing vessels could include:

- Identification of funding sources, and securing of funding;
- Design of emissions-testing protocols to validate emission reductions;
- Selection of candidate vessels for demonstration projects;
- Development of criteria for judging the success of a demonstration retrofit program;
- Testing of emission-control technologies in real-world use;
- Evaluation of these technologies for widespread use;
- Formulation of a plan for widespread implementation.

However, as previously outlined, due to the significant capital investment required, the development of creative partnerships and innovative strategies is necessary to build momentum for the implementation of retrofit technologies and cleaner-fuels strategies.

## **PARTNERSHIPS AND INCENTIVES**

The Maritime Air Quality Working Group (MWG), led by CARB, is an industry-wide group of stakeholders including air agencies (CARB, USEPA, and local air districts), environmental groups, and shipping industry representatives (owner operators, ship captains, major engine manufacturers, technology vendors and marine consultants). The group's goal is to gain a basic understanding of the shipping industry, identify control technologies that can reduce NO<sub>x</sub> and PM emissions from ship engines, and determine how to make these technologies attractive for both retrofit and new implementation by carriers.

The MWG has had several meetings over the last year that have incorporated presentations on available and developing control technologies, and the group is currently reviewing vendor proposals to demonstrate retrofit control technologies on ship engines at sea. The APCD participates in this working group and is interested in seeing cost-effective control technologies successfully installed on one or two ships over the next year.

The US Department of Transportation Maritime Administration (MARAD) is pursuing in parallel a program to review, select, install, demonstrate and test emissions of retrofit control technologies for reducing NO<sub>x</sub> emissions of large ship engines. MARAD is investigating possible incentive programs to encourage control technology installation on coastal vessels, and will determine if these technologies increase combustion efficiency, thereby saving fuel and reducing greenhouse gases. It is likely that the MARAD demonstration will be the first partnership project for the MWG stakeholders.

Business for Social Responsibility (BSR) is a consortium of businesses interested in improving the environmental and social impact of their operations, and of their suppliers. Among many other programs, BSR has formed a Clean Cargo Program to encourage the

ship owner operators – their “carriers”- to reduce emissions from their sea transport operations.

A range of incentive programs that could be evaluated include:

- Emission reduction credits – A system in which credits are provided for reducing vessel emissions that can be traded within a market-based system.
- Differential port fees – A system where cleaner vessels pay lower fees and dirtier vessels pay higher fees with a net result equal to the existing fee structure.
- Government incentives – Similar to California’s Carl Moyer Program in which funds are allocated to cost-effective projects, based on the merits of the project and the level of cost share funding.
- Environmental award programs – A system in which cleaner vessels are provided the recognition and positive publicity for being the cleanest of the fleet.
- Preferential port access – A system in which the cleanest vessels have the best access to port facilities.

These types of incentive programs need to be carefully evaluated as part of the effort to reduce emissions from the existing fleet. Without some type of incentive program, the information and experience gained in retrofit demonstration projects may not be realized due to the large capital costs associated with many of the technologies discussed in this paper.

It is important to coordinate efforts toward understanding the dynamics of the shipping industry, and researching and demonstrating control technologies by building partnerships, evaluating incentive programs, and sharing results. Only with a cooperative, partnership-based approach will we realize emission reductions from the existing vessels that transit along the Santa Barbara coastline and other areas nationally and globally.

## CONCLUSIONS

As documented in the Santa Barbara County emissions inventories, marine shipping emissions currently impact onshore air quality, and, if left uncontrolled, will be of increasing concern in the future. Conclusion points of interest are listed below.

- Marine shipping emissions are significant and largely unregulated locally, nationally and globally.
- If marine shipping emissions continue to increase without controls, they may threaten attainment strategies of coastal (and inland) areas. This could increase the need to reduce emissions onshore, where many of the most achievable and cost-effective reductions have either already been obtained or are in process.
- International and national regulatory efforts have been largely ineffective to date, and should be strengthened to set targets for development of new engine technologies.
- While regulatory strategies are important to reducing these emissions in the long term, a near-term strategy is needed for existing vessels.

- Many control technologies are available that can potentially reduce emissions in the near term from existing marine vessels at a relatively low cost per ton of NOx reduced. In fact, these technologies are significantly more cost-effective than typical onshore emission controls.
- Retrofit of existing vessels with emission controls will demand a high capital expenditure.
- A coordinated partnership-based approach will be necessary to support the capital expenditure, and provide for the evaluation, implementation and verification of retrofit technologies through demonstration programs.
- Once a technology or set of technologies is proven, additional funding partnerships and incentives programs will be needed to expand implementation programs with existing vessels.

## ACKNOWLEDGMENTS

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## KEY WORDS

Marine Shipping, Marine Shipping Emissions, Compression Ignition Engines, Air Pollution Control, Santa Barbara County, Annex VI, Emission Control Technologies, Clean Air Plans, Container Ships

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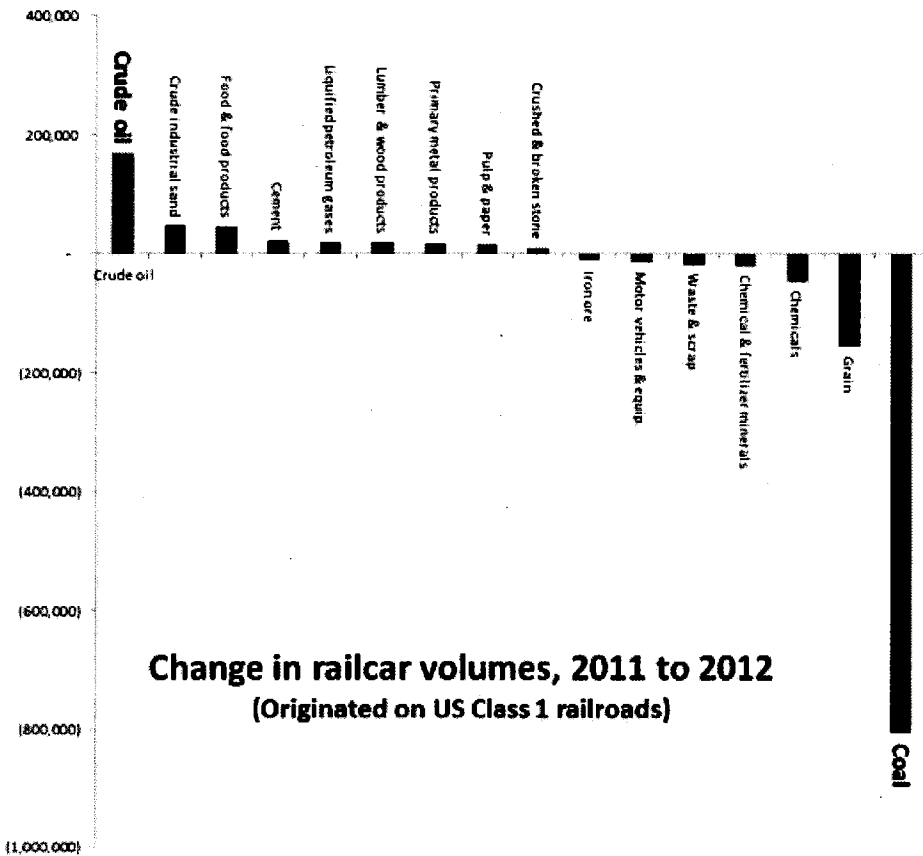
# US Oil Train Trends: Four Basic Pictures

How oil by rail is reshaping railroads.

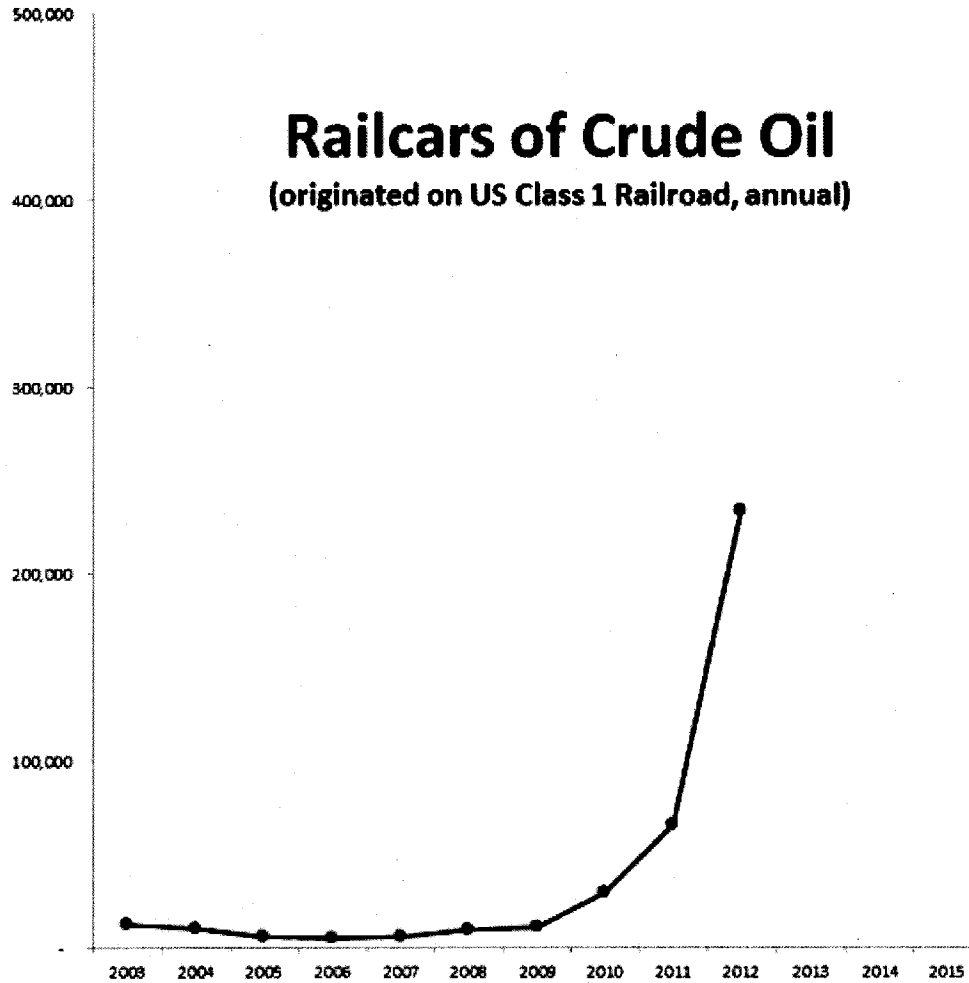
Eric de Place on November 14, 2013 at 10:37 am

Oil-by-rail schemes are popping up across the Northwest and beyond, raising serious questions about public safety given that they have a nasty tendency to explode catastrophically. Even more worrisome, oil train numbers are increasing at a rate so astonishing that we cannot rely on historical trends or safety statistics. To illustrate the new era of freight rail, I put together four charts drawn from data published by the American Association of Railroads.

Oil is far and away the fastest growing type of freight hauled by rail in the US (although its increase does not come close to offsetting the recent precipitous decline in coal transport).



From 2009 to 2012, oil by rail volumes multiplied more than 21 times, from fewer than 11,000 railcars nationally to well over 230,000:

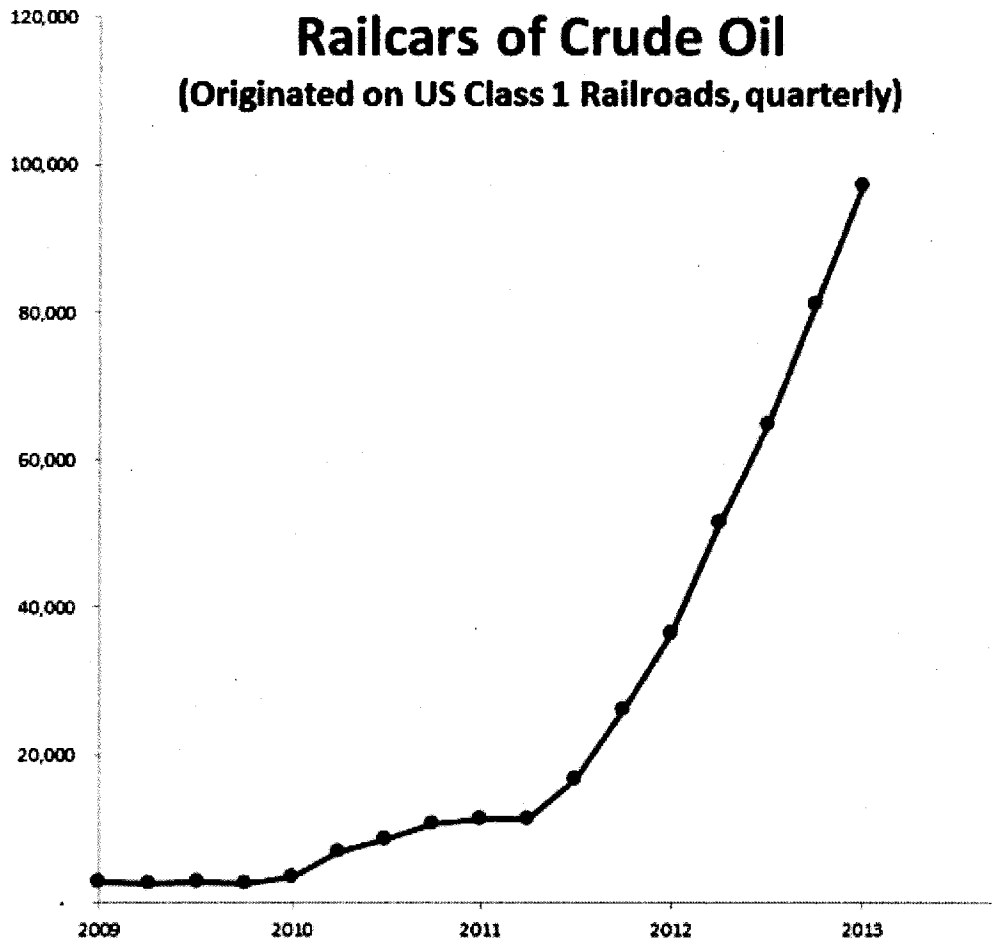


The

skyrocketing growth rate of oil trains is continuing in 2013. The most recent quarterly data shows that the first quarter of this year saw more than 2.5 times as many oil railcars as the first quarter of 2012:

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## Railcars of Crude Oil (Originated on US Class 1 Railroads, quarterly)



In North Dakota, home to the majority of Bakken oil extraction and originator of most oil trains, the growth in crude oil shipments has been staggering, growing more than sixfold in a little over a year:



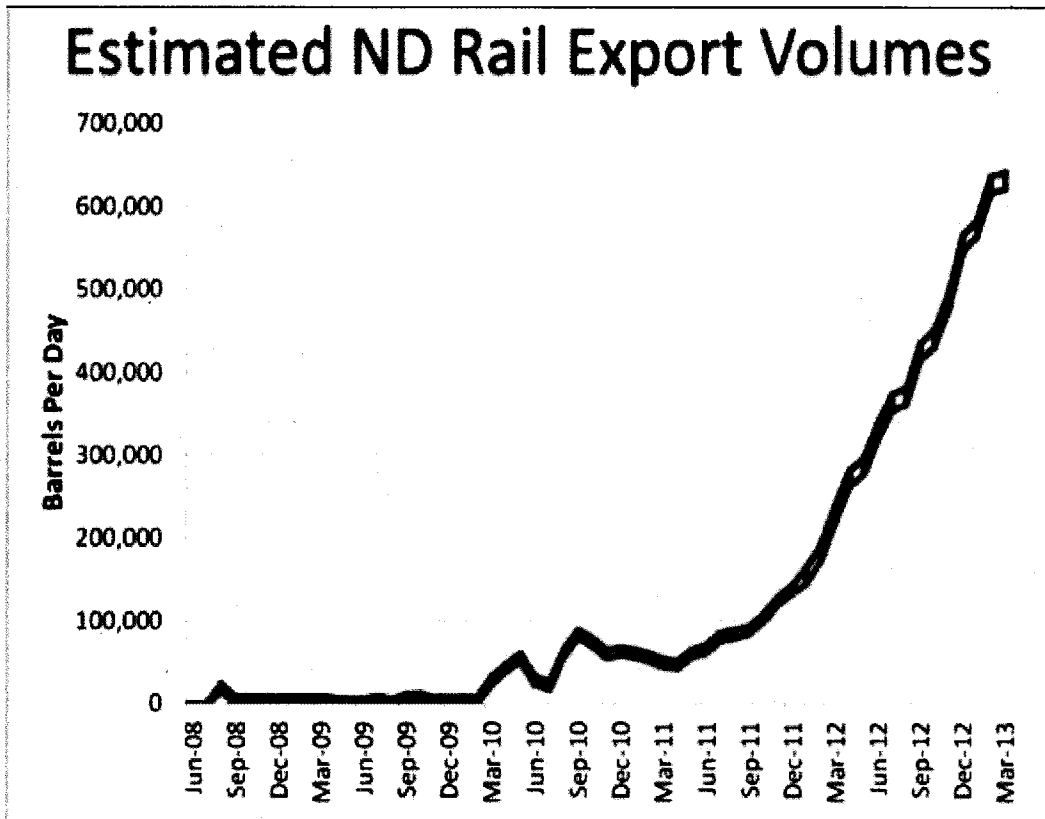


Chart from "Moving Crude Oil By Rail," a report from the American Association of Railroads,

<https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf>.

Because the growth of oil trains has happened so suddenly, neither the public nor the industry should rely on historical trends or safety statistics. The simple fact is that the US has never experienced large-scale oil-by-rail movements to the degree that we are now.

**Notes.** All data in this report come from Moving Crude Oil by Rail, a report from the American Association of Railroads. The data shown in the charts here are conservative because they do not count crude oil shipments originated on railroads in Canada or on US short rail lines.

## NEDC Scoping Comments

**The New York Times**

Exhibit 3



January 25, 2010

**Railroads, Utilities Clash Over Dust From Coal Trains**By JOSH VOORHEES of Greenwire

An effort by railroad companies to control dust blowing from coal trains has drawn the wrath of electric-power generators and the attention of federal regulators.

On its face, the dispute affects just more than 200 miles of track on two lines operated by BNSF Railway Co., but there are wide-ranging financial implications for the bottom lines of all U.S. railroad companies and the electric bills of ordinary Americans.

Three major rail carriers -- Union Pacific Corp., Norfolk Southern Corp. and CSX Corp. -- have filed paperwork to join the battle over coal dust. So have groups representing other shippers and power companies, including the American Public Power Association, which represents 2,000 or so community-owned utilities with more than 45 million Americans.

While the rail lines at the heart of the fight represent a fraction of the 233,000 miles of track in the United States, they rank with the most heavily traveled in the world and arguably the most important for U.S. energy production. The lines offer the only rail access to the Powder River Basin, a 20,000-square-mile region in Wyoming and Montana that produces 400 million tons of coal annually, almost 40 percent of the nation's total.

Two train derailments in May 2005 on the shorter of the two lines -- the Powder River Basin joint line -- left utilities short on coal, drove up energy prices nationwide and spurred warnings of possible brownouts.

Due to delayed coal deliveries and a lack of capacity after the derailments, Union Pacific -- which shares the joint line with BNSF -- stopped accepting new customers for Powder River Basin coal for nearly two years, from July 2005 to March 2007.

It was those derailments, BSNF said, that spurred its investigation of the effect of coal dust on railroad tracks.

After an extensive study, the company determined a dust buildup can prevent water from draining from track beds, which in turn can push steel rails out of gauge and cause derailments.

In order to prevent a repeat of 2005, the company told coal shippers last summer that it planned to limit coal dust leaving trains. BNSF left it up to the shippers, which own or lease the vast majority of the open-topped coal cars, to figure out how to meet the emission limit and how to pay for it.

'Double dip'

The dust limits were originally set to kick in last November, but BNSF delayed them until August after

shippers asked the federal Surface Transportation Board to intervene. The railway, meanwhile, has welcomed a board review, believing its three-member panel will rule in its favor.

Power plants and shippers are opposing the coal dust cap for two main reasons. They say there is no proven link between coal dust buildup and the derailments. And even if such a link exists, they say, cleaning up the dust should be done by railways, which are responsible for track maintenance under their contracts with shippers.

By forcing the shippers to tackle the dust problem, the power companies maintain railroads are double-dipping, charging twice for the same service. Once, for the maintenance costs that are part of shipping contracts, and a second to limit dust emissions.

The Arkansas Electric Cooperative Co. (AECC), a utility that serves roughly 500,000 customers and has an ownership stake in three coal-fired coal plants, was the first to request federal intervention. The company did not return calls seeking comment, but in paperwork filed with federal regulators, its lawyers maintain BNSF is to blame for the track problems on the joint line.

"There are strong reasons to believe that substandard construction and failure by BNSF to perform proper routine track maintenance are the primary causes of the problems that BNSF blames on the coal dust, including the 2005 derailments," the filing states.

#### Mitigation costs

Coal dust emissions can be limited by several basic steps, such as by low-profile "bread loaf" loading -- where the top of the coal pile is rounded to produce less drag -- or by strategically positioning coal-carrying cars along the train to shield them from the wind.

Still, to achieve the limits BNSF is hoping to implement, coal shippers would likely need to take additional steps, such as covering loads with tarps or, more likely, spraying on a latex coating to keep dust from taking flight.

Regardless of the option chosen, emissions mitigation will come at a price.

Industry estimates the spray will cost 10 cents to 30 cents per ton of coal. The Arkansas cooperative said vendors have failed to provide specific quotes, but their own estimates put the cost to shippers "in excess of \$100 million annually."

Furthermore, the cooperative argues that even if coal dust were to blame for track damage and regular maintenance won't solve the problem, BNSF's proposal for monitoring dust is arbitrary and unfair. Because trackside monitors would be placed in set locations, longer-traveling trains would shed a lot of dust before reaching a check point. Likewise, shorter trains with fewer coal cars would likely emit less dust than longer ones.

"The nature of the coal dust problem -- if there even is one -- has not been defined, and there is no assurance that shippers can, on their own, solve the problem to the satisfaction of BNSF's monitoring system," AECC's filing states.

BNSF officials declined to comment given the ongoing proceedings, but their filings argue that the "extremely high traffic levels" from the Powder River Basin pose "formidable operational challenges" that make the dust cap necessary.

The railroad's filing stresses that it has no provisions to enforce compliance or include penalties for a failure to meet dust limits. And the company decries "speculative" arguments that it could deny service to shippers that fail to meet the dust standard.

But there is little doubt that increased shipping costs would be passed on, at least partially, to the customers, leading utilities to complain that average Americans will get socked in the wallet.

"If shippers cannot satisfy BNSF's arbitrary emissions standard, and BNSF refuses to transport their coal from PRB, the generation of electric power for huge numbers of customers will be put at risk," AECC's filing states.

### Coal shipping

The Powder River Basin consists of 18 coal mines, including Arch Coal's Black Thunder mine, the largest in the world. The 400 million tons mined annually are shipped to more than 30 states, the Powder River Basin Coal Users' Group said.

The vast majority of that coal must first travel a 103-mile joint line. According to a 2007 Congressional Research Service report, the line handles more than 60 loaded coal trains each day, with each stretching more than a mile.

Power plants buy coal from a number of mines and regions based on coal's price, energy content and transportation cost.

Powder River Basin coal is among the easiest and cheapest to mine. For the week ending Jan. 15, a short-ton of Powder River coal was selling at a sixth of the price of Central Appalachian coal, according to the U.S. Energy Information Administration. The low price is often enough to offset Powder River coal's relatively low energy content and high shipping prices.

Shipping rates for moving coal along the BNSF's joint line -- which is partially owned by Union Pacific but operated fully by BNSF -- has been a sensitive subject.

In 2007, North Dakota-based Basin Electric Power Cooperative complained to the Surface Transportation Board that BNSF was a monopoly and charged too much for service. The board ruled in favor of the railroad, saying the cooperative failed to prove rates were "unreasonably high."

Last February, however, the board sided with Basin Electric and the Western Fuels Association in a separate case and forced BNSF to slash rates on particular coal runs and reimburse an estimated \$100 million to customers.

### Buffett's bet

Berkshire Hathaway Inc., the investment firm headed by finance icon Warren Buffett, made headlines last

year when it announced a \$26 billion buyout of the remaining BNSF shares. Buffett hailed the move as an "all-in wager on the economic future of the United States," but the move was seen by some as a big bet on coal.

Even with recent dips in U.S. coal use, coal remains by far the cargo most hauled by rail. In 2009, railroads moved more than three times as much coal as they did chemicals, the second most-hauled commodity measured by freight car volume, according to the American Association of Railroads.

Major railways are capital-intensive businesses that are unionized and heavily regulated, adding to already-expensive operations. Up to half of BSNF's annual operating expenses go to short-term variables like labor, fuel and track maintenance, which is particularly cost-intensive along the heavily traveled joint line.

In 2006, BNSF and Union Pacific began work on a \$100 million improvement to the Powder River Basin track. At the time, Matthew Rose, BNSF's chairman, president and CEO, said the project "underscores BNSF's commitment to this country's coal and power industries."

Still, in the same statement, Rose stressed that the burden should not be carried by the railroads alone. "The rail, mining and generating industries," Rose said, "all need to work together to keep coal a strong part of the nation's future energy program."

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For Immediate Release:

Dated: Saturday, July 6, 2013

**Montreal, Maine & Atlantic Railway (MMA)  
Derailment in Lac-Mégantic, Quebec**

At approximately 1:15 AM EST, an eastbound Montreal, Maine & Atlantic Railway train with 72 carloads of crude oil and 5 locomotive units derailed at the Rue Frontenac road crossing in Lac-Mégantic, Quebec.

Early reports indicate that the train was stopped and tied down by the locomotive engineer at 11:25 PM on the mainline at Nantes, a station approximately 6.8 miles west of Lac Megantic, for a crew change. Subsequently, the train moved downhill into the town of Lac-Mégantic, where the derailment occurred. The engineer was not on the train, but had proceeded to his resting point at a hotel in Lac-Mégantic. He is safe.

Railway personnel were able to pull 13 carloads intact from the site at the rear of the train. At this time we don't know how many cars are derailed. Further details will be gathered from the event recorder onboard.

We have reports of explosions and buildings in the city on fire, and a number of fatalities and injuries. Emergency response teams are at the site coordinating rescue efforts, but access to the site is limited while they continue to fight the fires.

MMA management and employees are devastated at this news. We extend heartfelt condolences to those residents of Lac-Mégantic who have lost their homes and businesses, and particularly those who have suffered injuries and lost loved ones. We intend to have representatives on site as soon as possible to lend assistance to the community and to deal with individual issues coming out of this disaster.

MMA will cooperate with government safety agencies in determining cause.

We will supplement this information as soon as we can.

###

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# Measuring the Impact of Intermodal Rail Movements in State Transportation Planning

by Dan Seedah and Robert Harrison

Department of Civil, Architectural and Environmental Engineering, The University of Texas at Austin, Texas.

*As state transportation planners seek to build or support sustainable transportation systems in an era of economic challenges, they find few publicly available rail analysis models for stakeholders to examine the environmental impacts, socio-economic effects and costs associated in investing in rail infrastructure. This paper, taken from a University Transportation Center Program (UTCP Region 6) funded study presents stakeholders with the building blocks necessary to develop an integrated rail analysis model. It also reviews the current state of rail modeling, current rail models and presents a preliminary intermodal rail costing model .*

## INTRODUCTION

Analyzing rail operational benefits and costs is an inherently complex process. Forkenbrock (2001) and Bereskin (2009), suggest several factors which may contribute to this complexity and which include technological innovations, economies of scale, scope and density, joint production among rail companies-, and lack of data on specific expenditures pertaining to individual freight movements. Furthermore, the high capital costs required to construct and maintain rail service obscures the ability of outside analysts to determine how much it actually costs the railroad to transport any given shipment. Nevertheless, an understanding and ability to simulate rail operations is essential for transportation stakeholders to examine the environmental impacts, socio-economic effects and costs associated with investing in rail infrastructure.

Methods to determine rail costs have always been central to rail operations and since deregulation several academicians and government organizations have developed models to examine various components of rail operations. In the area of rail costing, noted authors like Bereskin (2001, 2007, 2009), Forkenbrock (2001), Caves et al. (1980,1981), Ivaldi and McCullough (2001), and Spady et al.( 1976,1979) reported on the railroad industry's achievement of productivity gains over time and through mergers, the non-linearity of rail costs (Bereskin, 2001), and the existence of economies of scope in the railroad industry<sup>1</sup> and produce different outputs at different cost levels (Bereskin, 2009). In addition, findings have shown that increases in rail traffic have the potential to result in diseconomies (Bereskin, 2009) as a result of traffic delays. Government agencies such as the Surface Transportation Board (STB) are more limited in the types of tools they can use in determining impacts of rail service change or whether rates are in line with variable cost. For two decades, the Surface Transportation Board (STB) has used the Uniform Rail Costing System (URCS) model. URCS is the STB's railroad general purpose costing system that is used to estimate variable and total unit costs for Class I U.S. railroads. While the model has significant limitations, it is still the official tool used by the STB. The URCS model can be used for costing specific traffic with less concern for economic

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<sup>1</sup> Especially the ability of railroads to use similar infrastructure and equipment for different operational purposes,

characteristics (Bereskin, 2001). URCS uses system average units based on costs relationships and system data for Class I railroads. The data are updated annually by the STB however the basic structure of the models remains as it was when it was developed decades ago and does not reflect modern railroad operations. For example, there is no clear way to delineate double stack intermodal as this technology was not widespread at the time of the model's development. For several reasons, the cost estimation method used by URCS is now not entirely accurate. Recently the STB announced its intention to begin the process of replacing the URCS model due to its well known limitations.

In the area of railway engineering, DeSalvo (1969), Hay (1982) and Avallone et al. (2006) have published work on rail operations which can assist researchers in simulating line haul movements. Others have investigated railroad system performance, technological innovations, terminal operations, and preventive maintenance schemes. However the need for a publicly available rail analysis modeling framework that can be used by stakeholders in policy making still remains. Such a framework would assist stakeholders in determining the environmental impacts, socio-economic effects and costs associated with investing in rail infrastructure. This paper seeks to introduce the building blocks of such a framework, and also present a preliminary intermodal rail costing model developed as part this UTCP study. The framework as show in Figure 1 is composed of three main components external parameters, asset management, and operating parameters.

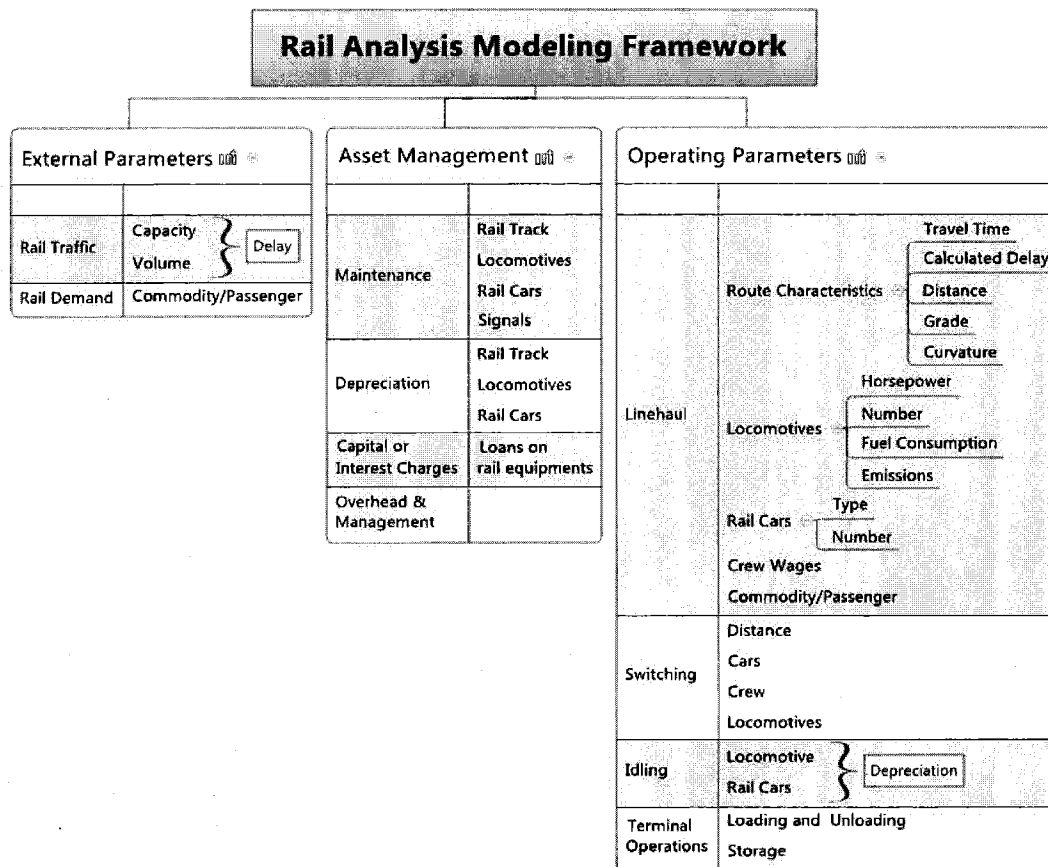


Figure 1: Rail Analysis Modeling Framework



## METHODOLOGY

### External Parameters

External parameters include the influence of rail traffic and rail demand on individual rail movements. As noted by Hay (1982), railroads incur continuing capital and maintenance costs regardless of whether equipments are used or not. These fixed or continuing costs are referred to as overhead costs. Overhead costs and direct costs are distributed over the volume of traffic handled. The greater the rail traffic, the lower the share of fixed cost borne by a single unit of traffic. This concept is illustrated in Figure 2: Illustration of Unit Cost versus Traffic Volume Figure 2 by Hay (1982).

Unit cost decreases from point A to B as traffic volume increases. As volumes keep increasing from B to C, unit cost begins to increase again as congestion, delays and maintenance costs build up. When additional capacity is provided at point D, unit cost begins to reduce again to point E (Hay, 1982). The graph also illustrates incremental costs as any increase traffic  $x$  (e.g.  $x+1$ ) results in decrease in unit cost  $y$  (i.e.  $y-y'$ ).

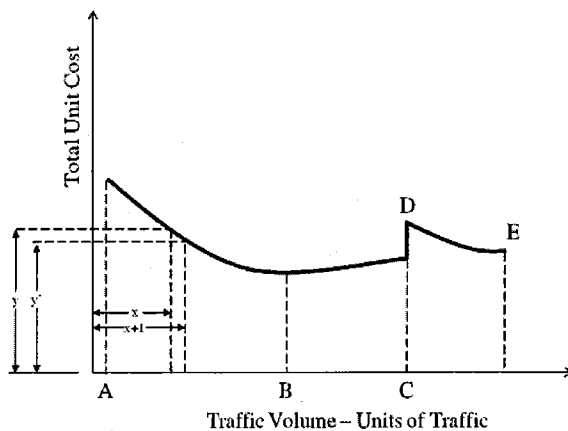


Figure 2: Illustration of Unit Cost versus Traffic Volume

Source: Hay, 1982

The external parameters block assists stakeholders in measuring the impact of rail capacity and corresponding delays when volumes increase. It can also be used in projecting how demand can affect the entire rail network. This is important as demand drives the volume of traffic on the network at any given time. The external parameter block serves as an input for the operating parameters block, thereby assisting stakeholders in determining how demand and volume influence individual rail movements.

### Asset Management

Rail asset management involves the management of all railroad equipments and personnel. Items include equipment maintenance, asset depreciation, capital or interest charges, and overhead and personnel management. Equipment maintenance includes taking stock of the number of specific equipments and the cost associated with maintaining the equipment. Asset depreciation accounts for the reducing value of owned equipment. Capital or interest charges are cost accrued from the

purchase of new equipments and the upgrading or development of rail infrastructure such as tracks and signals. Overhead and personnel management is comprised of the salaries and benefits meted out to employees of the railroad. Asset management may also include equipment leasing and rental where applicable. The asset management block also provides data to be used in the operating parameters block when simulating the cost associated with individual rail movements.

### **Operating Parameters**

Operating parameters involve the simulation of a single train through a pre-specified set of inputs such as route characteristics, type of locomotive, type of rail cars, commodities transported, emission rates, crew wages, and loading and unloading operations. Some inputs of the operating parameters block such as travel time and maintenance costs are calculated from the two other building blocks. The external parameters block determines the calculated delay of rail operations based on capacity and demand, and items such as the cost associated with equipment depreciation and track maintenance is calculated from the asset management block.

With all of these building blocks working together, stakeholders have the capability of modeling various scenarios of rail operations and determining the environmental impacts, socio-economic effects and costs associated with investing in rail infrastructure.

### **INTERMODAL RAIL MODEL**

As part of this study, a preliminary intermodal rail model (IRM) which forms part of the line haul section of the operating parameters block was developed. The core equations governing the line haul model were adapted from work by DeSalvo (1969), Hay (1982) and Avallone et al. (2006). The model enables stakeholders to measure operational differences between TOFC and double stacked intermodal service, emissions produced during line haul operations, operational differences when using multiple locomotives or car types, influence of delay, and other route specific characteristics such as grade changes and road curvature.

### **Cargo Weight, Number of Containers, and Rail Car Configuration**

There are numerous types of rail cars and each has its own tare weight, cargo capacity, and load limit. IRM allows users to select between ten different types of rail cars and container types. When simulating an intermodal TOFC service and given a certain number of cars,  $N_c$ , the total weight of cargo will be

$$W_c = \sum_{i=1}^{N_c} w_{c_i} \quad (1)$$

For an intermodal double stacked service, given a certain number of containers,  $X$ , the total number of cars will be

$$N_x = \frac{X}{2} \quad (2)$$

And the total cargo weight will be

$$W_s = \sum_{i=1}^{N_x} w_{s_i} \quad (3)$$

### Locomotive(s)

The total number of locomotives is dependent on the horsepower of each locomotive and the desired horsepower per trailing ton ratio (HPTT). HPTT is determined by railroads, and varies by route and service type. It dictates the desired maximum speed of the train which in turn influences travel time and fuel consumption. The typical ratios used by Class I railroads varies between 2.5 to 3.5 HPTT for intermodal and less than 2.5 for coal and other heavier cargo. IRM enables the user to specify the desired ratio and calculates the total HP required. The total number of locomotives ( $N_L$ ) is then calculated based on the required HP divided by the specified horsepower of each locomotive ( $HP_{L_i}$ ).

$$N_L = \frac{HP_{required}}{HP_{L_i}} \quad (4)$$

Given the weight of a single locomotive as  $w_{l_i}$ , the total weight of all the locomotives is equal to the sum

$$W_L = \sum_{i=1}^{N_L} w_{l_i} \quad (5)$$

The total weight of the train,  $W$ , can be calculated for a non-containerized movement or a TOFC service as

$$W = W_c + W_L \quad (6)$$

For a double stacked service,  $W$  is calculated as

$$W = W_s + W_L \quad (7)$$

For a mix of single and double stacked containers<sup>2</sup>,  $W$  is calculated as

$$W = W_c + W_s + W_L \quad (8)$$

### Train in Motion

According to Hay (1982), train movement and speed are opposed by various forces (resistances) which must be overcome by the propulsive force (tractive effort) of the locomotive. These forces contribute to the operation of the rail and the overall operating costs (Hay, 1982). Internal resistance of the locomotive, resistances varying directly at the axle loading (journal friction, rolling resistance, and track resistance), flange resistance, air resistance, and track modulus resistance are always present during train movement. An expression for these resistances was

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<sup>2</sup> The model gives users the ability to combine single and double stacked containers and other different car types

developed empirically and known as the train resistance. Wind resistance, external axle loading resistance, curve resistance, grade resistance, acceleration resistance and inertia (starting) resistance are only present intermittently but are also estimated through empirical relationships (Hay, 1982). IRM currently calculates train speed as a function of tractive effort, train resistance, curve resistance and grade resistance.

### ***Tractive Effort***

Tractive effort is the force required to pull a train. It is determined by the equation

$$F_T = (hp_e - hp_a) \times 375 \times e/V \quad (9)$$

where

$F_T$  = tractive effort in pounds

$hp_e$  = engine shaft horsepower

$hp_a$  = horsepower to auxiliaries

$V$  = speed in miles per hour

$e$  = efficiency which varies between 0.70 (AC) and 0.8 – 0.85 (DC) locomotives

The most common interpretation (DeSalvo, 1969; Hay, 1982) for the above equation is shown below by taking efficiency (e) as 0.82 (e can however be modified by the user in IRM)

$$F_T = \frac{308hp}{V} \quad (10)$$

$hp$  is the manufacturer's rated horsepower, and  $F_T$  and  $V$  are as before (Hay, 1982). IRM allows the user to input any desired efficiency as it varies greatly for each kind of locomotive.

### ***Train Resistance***

Train resistance is modeled using the Basic Davis Equation, the Modified Davis Equation and the Adjusted Davis Equation. The Basic Davis Equation is known to result in resistances higher than the Modified and Adjusted versions but still relevant for calculating drag and flange friction resistance for locomotives.

Using the Basic Davis Equation, the train resistance for one locomotive is

$$R_{l_i} = 1.3w_l + 29a_l + bw_lV + cZV^2 \quad (11)$$

where

$R_{l_i}$  = train resistance of a single locomotive

$w_l$  = weight of a single locomotive

$a_l$  = number of axles – locomotives

$V$  = train speed

$Z$  = locomotive cross – sectional area (120 sq. ft)

$b$  = coefficient of flange friction (0.03 for locomotives)

$c$  = drag coefficient of air (0.0025 for locomotives)

The total train resistance for all locomotives is the sum of all locomotive resistances

$$R_L = \sum_{i=1}^{N_L} R_{Li}$$

$$R_L = 1.3W_L + 29A_L + bW_LV + cN_LZV^2 \quad (12)$$

where

$R_L$  = total train resistance of all locomotives  
 $W_L$  = total weight of all locomotives  
 $A_L$  = total number of axles of all locomotives  
 $N_L$  = number of locomotives

Substituting the values of b, c and Z, the resistance function for all the locomotives is

$$R_L = 1.3W_L + 29A_L + 0.03W_LV + 0.3N_LV^2 \quad (13)$$

Current improvements<sup>3</sup> in railroad operations resulted in the need to adjust the Basic Davis equation especially for rail cars (Hay, 1982). The modified Davis Equation is similar to AAR's equations and is appropriate for relatively high weights of 70 tons or more (RailSIM website, 2007). The modified Davis Equation for a single locomotive car is

$$R_{ci} = 0.6w_c + 20a_c + 0.01Vw_c + KV^2 \quad (14)$$

where

$R_{ci}$  = resistance of a single freight car  
 $w_c$  = gross weight of a single freight car  
 $a_c$  = number of axles of a single freight car  
 $V$  = speed in miles per hour  
 $K$  = air resistance (drag) coefficient with values of 0.07 for conventional equipment, 0.0935 for containers, and 0.1600 for trailers on flatcars.

The total train resistance for all rail cars is

$$R_C = \sum_{i=1}^{N_C} R_{ci} = 0.6W_C + 20A_C + 0.01VW_C + N_CKV^2 \quad (15)$$

where

$R_C$  = total train resistance of all freight cars

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<sup>3</sup> Current improvements include improvement on car trucks, improved wheels, roller bearings, heavier loading per car, improved journal lubricants and lubricators, stiffer subgrades, and stiffer rails (Hay, 1985)

$W_C$  = total weight of all cars  
 $A_C$  = total number of axles of all cars  
 $N_L$  = number of cars

The adjusted Davis equation is appropriate for intermodal trains, particularly those with double-stack containers or mixtures of different intermodal car types namely TOFC, single stack COFC, and double stack COFC (RailSIM website, 2007).

$$R_{adj} = K_{adj} (0.6W_C + 20A_C + 0.01VW_C + KN_C V^2) \quad (16)$$

where

$R_{adj}$  = adjusted unit train resistance  
 $R_D$  = conventional Davis resistance  
 $K_{adj}$  = an adjustment factor to modernize the Davis equation

Total train resistance is therefore equal to

$$F_u = R_L + R_C$$

$$F_U = 1.3W_L + 29A_L + 0.03W_L V + 0.3N_L V^2 + K_{adj} (0.6W_C + 20A_C + 0.01VW_C + KN_C V^2) \quad (17)$$

IRM automatically varies the K and  $K_{adj}$  values based on the equipment selected by the user. Other modifications of the Davis equation have been developed for more specific applications all of which apply to the cars trailing locomotives. These equations though not currently included into IRM, were developed by Tuthill and the Canadian National Railway (Avallone et al., 2006).

### **Grade Resistance**

Grade resistance is taken as 20 lbs/ton per percent of grade. It is derived from a relationship between the angle of ascent (or descent) and gravitational forces acting on the train (Avallone et al., 2006). The number 20 is a result of the conversion from tons to pounds. Grade resistance, train weight, and percentage grade can therefore be expressed as

$$F_g = 20Wg \quad (18)$$

where

$F_g$  = grade resistance, in pounds  
 $W$  = total weight of train (locomotive and cars), in tons  
 $g$  = percentage gradient of terrain

### ***Curve Resistance***

According to Avallone et al. (2006) the behavior of rail vehicles in curve negotiation is the subject of several ongoing AAR studies. Recent studies indicate that flange and/or gage face lubrication can significantly reduce train resistance on tangent tracks (Avallone et al., 2006). However, for general estimates of dry (unlubricated) rail with conventional trucks, the following expression is used

$$F_c = 0.8Wc \quad (19)$$

where

$W$  = gross weight of train in tons  
 $c$  = degree of curvature

### ***Train Cruising Speed***

Train cruising speed can be found using the equation of motion

$$F_T - F_u - F_g - F_c = 0 \quad (20)$$

Substituting into the above equation with the earlier defined  $F_T$ ,  $F_u$ ,  $F_g$  and  $F_c$  the equation of motion can be rewritten in the form

$$308hp - [1.3W_L + 0.6K_{adj}W_C + (20g + 0.8c)W + 29A_L + 20K_{adj}A_C]V - [0.03W_L + 0.01K_{adj}]V^2 - [0.3N_L + K_{adj}KN_C]V^3 \quad (21)$$

Solving Equation 21 iteratively, results in the determination of the train's cruising speed,  $V$ . On the other hand if the train's maximum speed is specified, IRM varies the horsepower per trailing ton (hptt) ratio in order to calculate the required horsepower needed to power the train at the specified maximum speed.

### ***Fuel Consumption and Cost***

Fuel consumption is calculated as a function of thermal efficiency, HP, and travel time. Thermal efficiency ( $\eta$ ) is defined as the ratio of work performed to energy consumed, and varies between 25 – 30 percent for a rail diesel engine (DeSalvo, 1969). To relate work and energy, the energy content of a gallon of fuel is assumed to be 138,700 Btu<sup>4</sup>, and work defined as the product of horsepower and time is converted to Btu via the formulae 2544 Btu = 1 hp-hr.

$$Work = 1hp - hr = 2545 Btu \quad (22)$$

---

<sup>4</sup> 138,700 Btu/gallon is the value reported by the Bureau of Transportation Statistics. Btu content of diesel however can vary between 129,500 Btu/gallon and 141,700. DeSalvo used 139,900 Btu/gal. in his analysis.

$$\text{Energy} = 138,700 \text{ Btu/gal} \quad (23)$$

$$\eta = \frac{\text{Work}}{\text{Energy}} = \frac{2545 \text{ gal}}{138,700 \text{ hp-hr}} \quad (24)$$

Given a diesel engine with horsepower, HP, let n be equivalent to gallons of fuel consumed per hour.

$$\eta = \frac{2545 \text{ HP}}{138,700 n} = 0.0183 \text{ HP}/n \quad (25)$$

The above equation can then be solved as

$$n = 0.0183 \text{ HP}/\eta \quad (26)$$

n is the gallons of fuel consumed per hour by a diesel locomotive with horsepower HP (DeSalvo, 1969). The model allows the user to specify the efficiency of the diesel engine as this varies with the type of locomotive. Current technological innovations have also increased locomotive fuel efficiency so the model allows users to correctly specify efficiencies greater than 30%. Future enhancements of the model will seek to include innovations that have increased fuel efficiency.

To calculate the cost of fuel, the user specifies a price (p) for a gallon of diesel fuel, and the fuel cost per hour ( $C_{f_h}$ ) can be calculated as

$$C_{f_h} = p * n \quad (27)$$

The total fuel cost per trip may be found by multiplying trip time (in hours) by fuel cost per hour. Trip time (T) is calculated by dividing the distance travelled (D) by the train cruising speed (V).

$$T = \frac{D}{V} \quad (28)$$

Therefore, given trip time (T) the fuel cost for a trip can be calculated as

$$C_F = p * n * T \quad (29)$$

$$C_F = p * \frac{0.0183 \text{ HP}}{\eta} * T \quad (30)$$

### ***Locomotive Emissions***

According to the EPA, there are several sets of locomotive emission standards. Each set is dependent on the date a locomotive was first manufactured. The first set of standards, Tier 0, applies to majority of locomotives manufactured before 2001 and the last set of standards, Tier 4,



are the most stringent standards for locomotives to be manufactured from 2015 and later (EPA, 2009). IRM's default emission standard is Tier 0 because majority of the locomotives currently in use by railroads fall under this category. However, the user can choose between any of the five standards when running the model. It should be noted that the emission rates provided by the EPA are approximations based on simplified assumptions as a single locomotive emission rate varies throughout its life as the engine ages and as ambient conditions change (EPA, 2009).

EPA emissions were estimated for two different types of operation: a low power cycle representing operation in a switch yard, and a higher power cycle representative of general line-haul operation (EPA, 2009). Line-haul emission rates are used in IRM and future modifications of the model will include switch yard operations. The EPA also provides conversion factors which relate fuel consumption (gal/hr) to usable power (bhp) of the locomotive engine. The difference in conversion factors can be traced to the locomotive age and duty cycle which tend to predict different emission rates for older locomotives and locomotives used for switching operations. Volatile organic compounds (VOC) are assumed to be equal to 1.053 times the HC emissions (EPA, 2009). Based on this assumption, it was possible to include VOC estimates in the model. Pollutants not included in the emission tables and the model include sulfur dioxide (SO<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) which are largely independent of engine parameters and primarily dependent on fuel properties (EPA, 2009).

### **Crew Labor Cost**

The model currently assumes a fixed daily labor rate. Previous authors have used formulas to calculate crew wages based on distance travelled. This approach though appropriate may not necessarily be accurate as different railroads have different rates and formulas when determining crew wages. An adjustable fixed daily rate is therefore used so user can input actual known crew wages. The number of crew members is then multiplied by the specified daily rate to determine crew labor cost. Future enhancements of IRM will seek to integrate crew labor wages with estimates provided by the asset management block. This would provide stakeholders with more accurate estimates of crew wages on line haul estimates as well as its influence on the overall operations of the railroad.

### **Maintenance Cost**

Track maintenance cost is determined by multiplying a known per mile system average rate ( $c_{mT}$ ) by the number of cars and locomotives in operation since track maintenance cost can be associated with the amount of traffic on a particular road. Car maintenance cost is specified by the user on a per-mile ( $c_{mC}$ ) basis, and multiplied by the number of cars in operation. Locomotive maintenance cost is also specified by the user on a per mile value ( $c_{mL}$ ) basis, and multiplied by the number of locomotives in operation.

$$C_{MT} = (N_C + N_L) * c_{mT} \quad (31)$$

$$C_{MC} = N_C * c_{mC} \quad (32)$$

$$C_{ML} = N_L * c_{mL} \quad (33)$$

Total maintenance cost is calculated as

$$C_M = C_{M_T} + C_{M_C} + C_{M_L} \quad (34)$$

where

$C_{M_T}$  = Total track maintenance cost

$C_{M_C}$  = Total car maintenance cost

$C_{M_L}$  = Total locomotive maintenance cost

Current estimates used in IRM are based on rail expert recommendations and may not be necessarily accurate for each individual railroad. However, with the integration of the asset management block, stakeholders would be able to develop more accurate maintenance figures based on the railroads anticipated maintenance expenditures. These can be calculated as a function of locomotive miles and car miles moved annually, as well as the cost associated with maintaining the rail tracks. Higgins (1998), Johansson and Nilsson (2004), Ferreira and Murray (1997), and Dekker (1996) all provide recommendations on the modeling and scheduling of maintenance scheme of rail tracks which can be used in predicting track maintenance costs.

### Capital and Investment Cost

Capital and investment cost are the most difficult to model. Railway capital costs include large investments in the construction of rail tracks, structures, rail yards, signals, and car and locomotive purchases. Without sufficient and reliable data, modeling investment cost associated with rail tracks, structures, rail yards and signals is almost impossible. IRM therefore only accounts for investment costs associated with locomotive and car purchase. These are known as the locomotive ownership cost and the car ownership cost. Using the straight-line depreciation equation, depreciation charge per hour is determined and multiplied by the total trip time.

$$\text{Hourly Depreciation} = \frac{\text{Cost of Asset} - \text{Scrap Value}}{\text{Life Span (years)} \times 8760 \frac{\text{hrs}}{\text{years}}} \times \text{Trip Time (hrs)} \times N \quad (35)$$

where

$N$  = number of locomotives when calculating hourly depreciation of locomotives

$N$  = number of cars when calculating hourly depreciation of cars

### Model Limitations

IRM is limited to line haul movement operation and therefore does not account for terminal operations which include arrival operations, inspection operations, classification operations, assembly and disassembly operations, and the labor involved in the above operations. Terminal operations are a substantial part of railroad operations and the cost involved in running terminal operations cannot be ignored in railroad cost analysis. However, for purposes of this research, we assume that terminal operations and costs are the same for all origins and destinations, and the primary concern is to determine how cargo weight, number of cars, type of loading (TOFC or double stack), rail track, car and locomotive maintenance, distance, travel time, delays, and capital investments influence line haul movement operation cost. Also of significant interest is

how varying fuel costs influence the rail industry. Loading and unloading operational costs are included to account for economies of scale in line haul operation.

Capital investments such as road construction, right-of-way acquisition, grading, signal and interlock installation, stations and office buildings, and all other infrastructural investment cost are not included. These costs do have a significant influence in the overall rail operation costs but are ignored because of lack of sufficient supporting data and variability amongst the various rail companies. Other expenses ignored include equipment rentals, purchased services, and other indirect expenses (AECOM, 2007).

Other operational limitations include assumption of trains being operated at full throttle even though this is not necessarily the case because of acceleration and deceleration. Acceleration and deceleration calculations can be omitted because of relative insignificance in comparison to the entire trip. However, research work has been done over the years to calculate the time lost during acceleration and deceleration (DeSalvo, 1969).

Concerning fuel consumption, the model assumes the train is running at full throttle. Example, for a SD70MAC, 4000hp locomotive running full throttle, the maximum gallons per hour consumed is 191.0 (Krug, 2006). When idling, locomotives consume 3-7 gallons of fuel each hour (Hotstart), a small figure in comparison with running at full throttle.

Finally, there is insufficient data from the rail companies to enable modelers to adequately estimate capital, maintenance and administrative cost associated with each trip, thereby making the determination of actual prices almost impossible. Railroads are reluctant in sharing such data due to the competitive nature of the business. Depending on the commodity type, railroad monopoly, and the route being used, railroad companies have additional charges such as switch charges, hazmat, and other charges not currently captured in the model. In addition, railroads install and maintain traffic signals, construct sidings, develop double tracks and spend on other capital investments which cannot be captured by this model. Based on all these limitations, IRM is not a complete rail analysis model and would need to be integrated with the other blocks of the rail analysis modeling framework.

## **FINDINGS**

Using IRM, various scenarios were simulated to determine their influence on rail costing and the environment. These include changing price of fuel, varying trip distance, comparison of TOFC movements to double stack movement, and relationship between train speeds, fuel consumption and emissions.

### **Changing Price of Fuel:**

The inputs below were used and fuel price was varied from \$1.00 a gallon to \$8.50 a gallon at 50 cents increments.

Number of containers: 200	Distance: 1000 miles
Fuel Price: Varied	Locomotive HP: 4,000 HP
Max Speed: 60mph	Loading and Unloading Cost per container:
Utilization ratio: 100%	\$0.00

As shown in Figure 3 (a) and (b), the relationship between costs and fuel price is a linear one with costs increasing with increasing fuel price. Figure 3 (c) demonstrates how the percentage of fuel in relation to other costs also increases with increasing prices. The rate of change for costs

however is dependent on all the other fixed cost components like maintenance costs and crew wages.

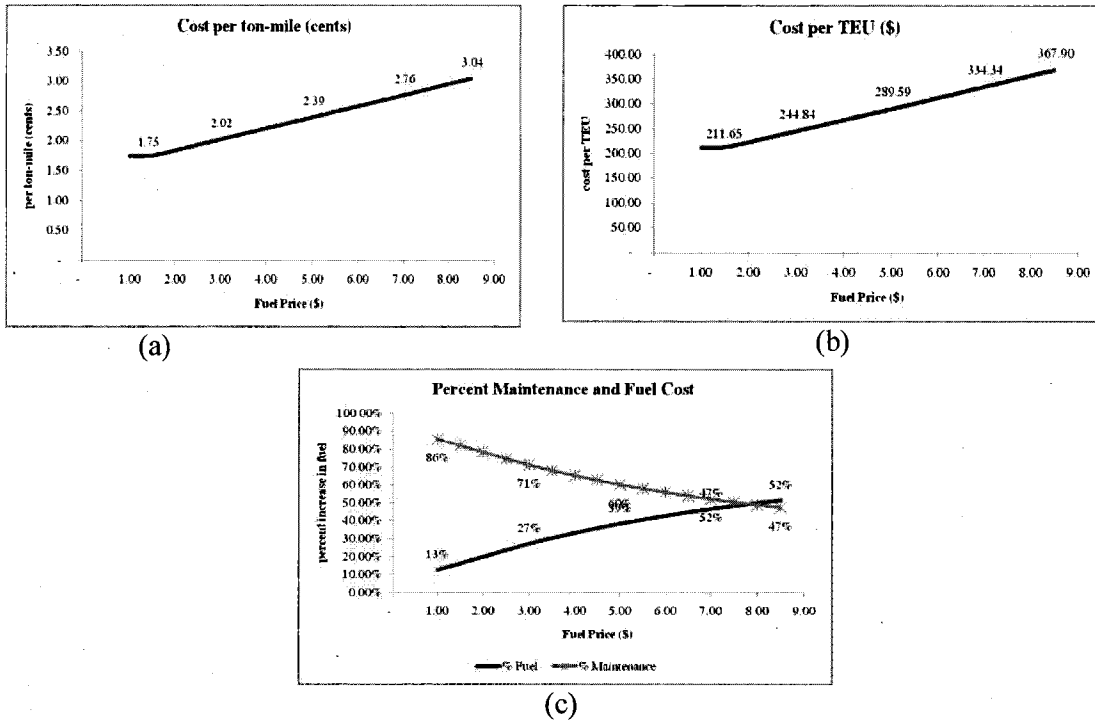


Figure 3: Effect of increasing fuel price on variable cost

### Varying Trip Length

Trip length was varied from 100 to 1,600 miles at 100 mile increments. This analysis was performed to determine the influence of trip length on rail line-haul costs. A loading and unloading cost of \$50.00 a container was included in the analysis to demonstrate economies of scale. Fuel price is kept constant at \$2.50 per gallon.

Because of the loading and unloading cost input, the economies of scale attributed to railway distances is shown in Figure 4 (a) and (b). After 500 miles, line haul costs begin to stabilize and this is the reason why rail is said to be more efficient for long distances compared to trucking. Fuel cost and maintenance cost also increase with increasing distance. Figure 4 (c) shows that the percentage of fuel and maintenance cost in comparison with other costs increases with increasing distance. Other components not shown here like required HP, train weight and number of locomotives remain constant.

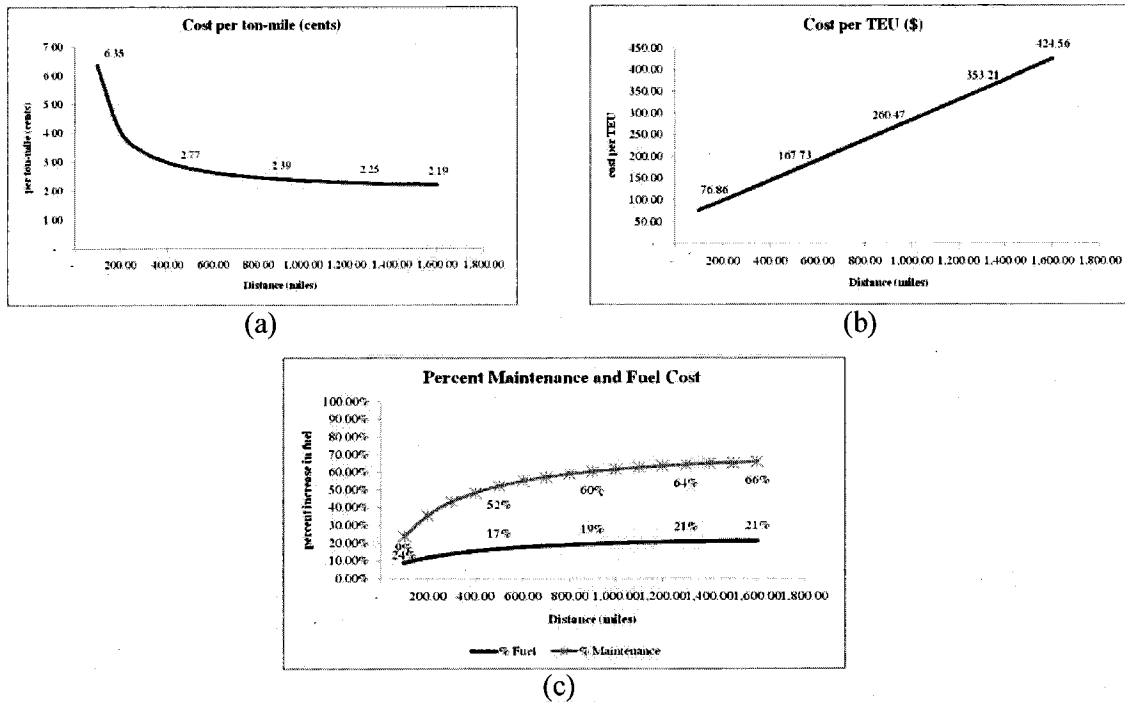
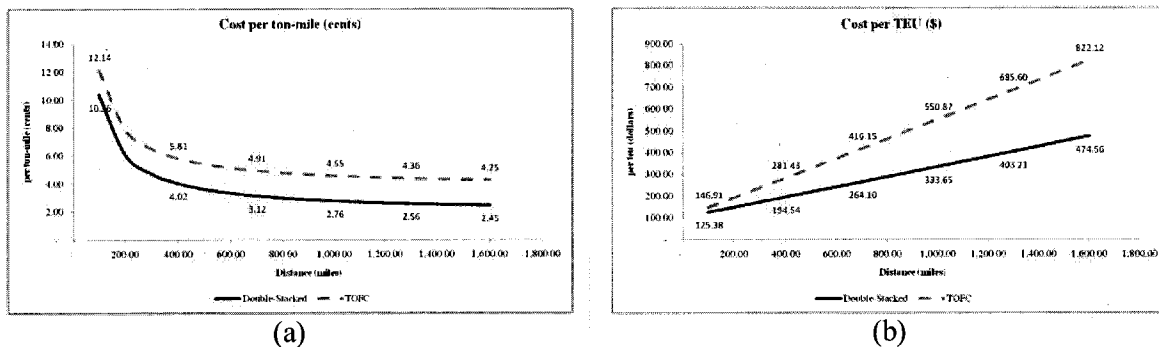
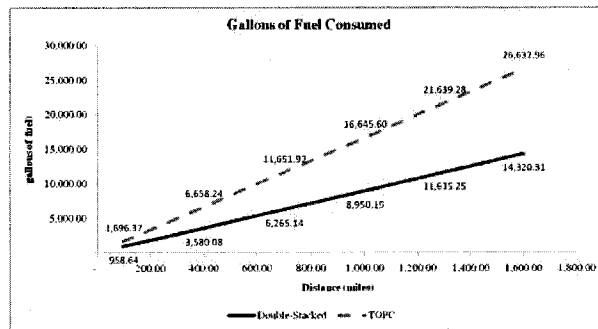


Figure 4: Effect of increasing distance on variable cost

### Comparison of TOFC to Double Stack Movements

Using similar scenarios as above, comparisons of TOFC and double-stacked movements were made by comparing the cost and fuel consumption for increasing distances. The results are as expected where double stack has been known to be more efficient than TOFCs. Measuring fuel consumption enables modelers to be able to estimate emissions produced as a result of the cargo configuration. This is a useful tool for stakeholders to decide on whether it is worth investing in rail infrastructure expansion and to measure the resulting outcome when such an investment is not made.



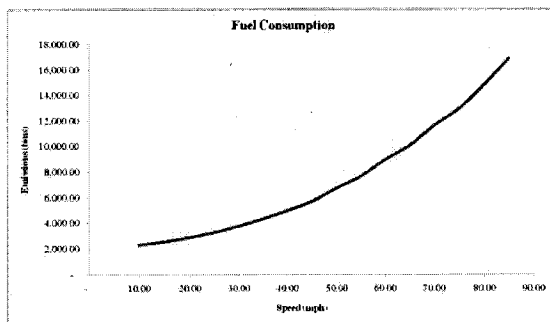


(c)

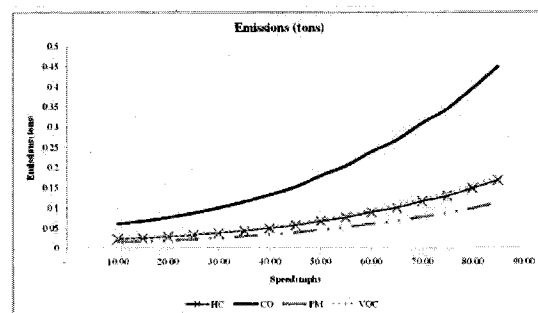
Figure 5: Comparing costs and fuel consumption differences between TOFC and Double Stacked containers.

### Relationship between Train Speeds, Fuel Consumption And Emissions

Another area of interest to stakeholders is the relationship between train speeds, fuel consumption and emissions emitted. The results below show how fuel consumption increases with increasing train speeds. Emissions are currently calculated based on the gallons of fuel consumed and this relationship can be clearly observed for HC, CO, PM and VOC emissions in Figure 6.



(a)



(b)

Figure 6: Comparing costs and fuel consumption differences between TOFC and Double Stacked containers.

### CONCLUSION

This study seeks to provide stakeholders with a means to examine the environmental impacts, socio-economic effects and costs of rail before making an investment. The rail analysis model framework is composed of three main components external parameters, operating parameters and asset management. With these three components working together, analyses can be performed with a tool such as the intermodal rail model to evaluate the effects of different intermodal schemes and the associated costs. Initial findings also showed how IRM was used in modeling scenarios such as the impact of changing price of fuel, the economies of scale associated with trip distance, the comparison of TOFC movements to double stack movements, and the relationship between train speeds, fuel consumption and emissions.

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**From:** g g <geneophotos@hotmail.cpm>  
**Sent:** Wednesday, December 18, 2013 3:01 PM  
**To:** EFSEC (UTC)  
**Subject:** EIS Scoping comments for Tesoro Savage proposal in Vancouver

Dear

As a community member, I am very concerned about the proposed Tesoro Savage project at the Port of Vancouver. I urge you to fully assess the impacts of this proposal to transport up to 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver, and other Northwest communities.

I urge you to include in the scoping of this proposal the implications to public safety, environmental impacts, and the health of our communities. These deserve a spotlight in the assessment of the state's largest oil-by-rail terminal proposed. Including,

- \* The compounding impact of multiple trains going through communities daily on traffic, community safety, and air quality;
- \* The threat of oil spills from trains and marine vessels along the Columbia, the Pacific Ocean, and the Puget Sound;
- \* The ability of communities to respond to an oil spill sourced from the Bakken oil fields and the Canadian Tar Sands safely and in a timely manner;
- \* The increase in oil tankers and the corresponding increased risk of oil spills throughout Washington waters and beyond;
- \* The project's impact on climate change. This analysis should include climate change impacts from crude oil from Bakken to Tar sands, cradle to grave;
- \* Safety of crude oil being transported by rail and the risks to communities along the route; and
- \* Terminal safety precautions related to the type and source of oil, level of combustion, and air emissions.

Thank you.

g g  
3  
orting, WA 98360

**From:** Jack Neff <jackneff01@yahoo.com>  
**Sent:** Wednesday, December 18, 2013 2:56 PM  
**To:** EFSEC (UTC)  
**Cc:** Greg Sotir  
**Subject:** Tesoro Savage Vancouver Oil Terminal

Stephen Posner,  
Interim Manager,  
Energy Facility Site Evaluation Council,  
P.O. Box 43172,  
1300 S. Evergreen Park Drive SW,  
Olympia, Washington 98504-3172

I very strongly oppose this oil proposed terminal. As a member of the climate concerned community, I join with those who are continuing to voice our opposition to this oil export onslaught. I recognize the rights of Native Americans to exercise control over tribal land and reservations to restrict fossil fuel resource extraction on those lands, including their right and the rights of all concerned grown-ups, to use mass civil disobedience to physically obstruct, delay and divert fossil fuel extraction, transportation and manufacture. Fossil fuel resource extraction creates a public nuisance, harms to human health, degrades of existing habitat for plants, animals, soil biota and bacterial organisms such as beneficial mycelae or fungii.

Jack Neff  
P.O. Box 491272  
Los Angeles, CA 90049

**From:** k g <kingroom@hotmail.com>  
**Sent:** Wednesday, December 18, 2013 3:02 PM  
**To:** EFSEC (UTC)  
**Subject:** EIS Scoping comments for Tesoro Savage proposal in Vancouver

Dear

As a community member, I am very concerned about the proposed Tesoro Savage project at the Port of Vancouver. I urge you to fully assess the impacts of this proposal to transport up to 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver, and other Northwest communities.

I urge you to include in the scoping of this proposal the implications to public safety, environmental impacts, and the health of our communities. These deserve a spotlight in the assessment of the state's largest oil-by-rail terminal proposed. Including,

- \* The compounding impact of multiple trains going through communities daily on traffic, community safety, and air quality;
- \* The threat of oil spills from trains and marine vessels along the Columbia, the Pacific Ocean, and the Puget Sound;
- \* The ability of communities to respond to an oil spill sourced from the Bakken oil fields and the Canadian Tar Sands safely and in a timely manner;
- \* The increase in oil tankers and the corresponding increased risk of oil spills throughout Washington waters and beyond;
- \* The project's impact on climate change. This analysis should include climate change impacts from crude oil from Bakken to Tar sands, cradle to grave;
- \* Safety of crude oil being transported by rail and the risks to communities along the route; and
- \* Terminal safety precautions related to the type and source of oil, level of combustion, and air emissions.

Thank you.

k g  
3  
orting, WA 98360

**From:** ERIC MEISGEIER <meisg@msn.com>  
**Sent:** Wednesday, December 18, 2013 3:11 PM  
**To:** EFSEC (UTC)  
**Cc:** info@jayinslee.com  
**Subject:** Tesoro Savage Petroleum Terminal LLC

I believe that this project will have significant negative impacts on the City of Vancouver and surrounding area's. There are significant risks associated with this project, including:

1. Risk of a catastrophic spill.
2. Risk of minor spills especially while cars are staged.
3. Risk of environmental and health impacts due to reduction of air quality.
4. Risk of impacts to emergency services ability to respond.

Constructing and operating this project will have significant adverse effects on the environment, ecology of the land and wildlife, and ecology of the state waters and aquatic life so it should not be recommended to go forward.

However should the project go forward I urge that the following mitigation be performed to reduce the risks outlined above:

1. For lines on which the trains will travel increased inspections of all rail infrastructure within the state of Washington to ensure no derailments and increased inspections of the rail cars prior to entering the state of Washington.
2. Development of a robust ground motoring plan to be overseen by an independent 3rd party.
3. Ongoing air quality monitoring including a baseline study performed by an independent 3rd party.
4. Grade separated crossings at all streets in the state of Washington where trains may be staged or traveling at slow speeds.

For all on-going monitoring measurable criteria should be established and significant penalties developed for non-compliance, including but not limited to fines and the ability to temporarily or permanently shut down the facility. An independent 3rd party paid for by fees from this facility should be set up to manage the process to ensure no conflict of interest. All results should also be provided to the public on a monthly basis.

Thank you for your consideration.

Eric Meisgeier

**(UTC)**

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**From:** Robin Iles <riles24fan@peoplepc.com>  
**Sent:** Wednesday, December 18, 2013 3:15 PM  
**To:** EFSEC (UTC)  
**Subject:** Reference Application No. 2013-01/Docket No. EF-131590: Please reject the proposed Tesoro Savage oil export terminal project

Dear Governor Inslee and Washington EFSEC:

I urge you to assess the full impact of Tesoro Savage's proposal to ship 360,000 barrels of oil each day through Spokane, the Columbia River Gorge National Scenic Area, Vancouver and the Columbia River. Oil-by-rail and export by ship is a bad deal for Washington State and the entire Northwest region. The project comes at a steep price for rail and river communities throughout the state and along the Columbia River, yet offers few jobs in return. Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's unprecedented proposal.

The public safety and environmental impacts of the state's largest pipeline-on-wheels proposal deserve close scrutiny. For example, EFSEC must assess:

- The potential impacts of a large train-related oil spill along the rail route in Washington and beyond.
- The transportation and public health impacts of additional unit train traffic through communities along the proposed oil-by-rail route. This includes evaluating emergency response capabilities in Vancouver, where oil trains would deliver and store oil, and other communities along the rail and shipping route.
- The increased risk of an oil tanker spill on Washington State waters and along the shipping route.
- The project's impact on climate change. This analysis should include climate change impacts from crude oil as well as tar sands oil from cradle to grave.

After carefully considering the safety, environmental, and climate risks associated with the project, I respectfully ask you to deny Tesoro Savage's application.

Thank you.

Robin Iles

81501

Tesoro Savage CBR  
Scoping Comment  
#30744

**No Oil Terminal in Vancouver**

To the Energy Facilities Site Evaluation Council (EFSEC) and Governor Inslee.

I urge you to assess the full impact of Tesoro Savage's proposal to bring 360,000 barrels of crude oil each day by rail through the Columbia River Gorge to a shipping terminal in Vancouver. This project comes at a steep price for rail communities and yet offers few jobs in return.

Two oil trains have already exploded within four months killing 47 people. In the face of those risks, downtown developments in Washougal, Camas, and Vancouver will be less attractive to investors.

The trains will cross dozens of salmon bearing streams. One derailment could destroy our salmon industry for decades.

Accidents happen . . . like the Exxon Valdez. Increased shipping traffic increases the risk.

The jobs of 3000 oystermen in Willapa Bay have already been jeopardized by CO2 emissions. We must not build new oil infrastructure. We don't need the oil. Sixteen models of electric cars are here.

Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's proposal.

Sponsored by: Columbia Riverkeeper, Friends of the Columbia Gorge and Sierra Club Beyond Oil SW Washington

Keith W Scheff

↑Name 98663  
1515 East 29th St Vancouver WA

↑Address, City and Zip

Keith.Scheff@yahoo.com

↑Legible Email  
Phone → 503.706.8737

I'm concerned about: I am concerned what effect this could have on the environment. We need to end our dependence on oil and focus on repairing and halting the damage done to the planet

**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

Tesoro Savage CBR  
Scoping Comment  
#30745

**No Oil Terminal in Vancouver**

To the Energy Facilities Site Evaluation Council (EFSEC) and Governor Inslee.

I urge you to assess the full impact of Tesoro Savage's proposal to bring 360,000 barrels of crude oil each day by rail through the Columbia River Gorge to a shipping terminal in Vancouver. This project comes at a steep price for rail communities and yet offers few jobs in return.

Two oil trains have already exploded within four months killing 47 people. In the face of those risks, downtown developments in Washougal, Camas, and Vancouver will be less attractive to investors.

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Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's proposal.

Sponsored by: Columbia Riverkeeper, Friends of the Columbia Gorge and Sierra Club Beyond Oil SW Washington

Pass upon Scheff

↑Name  
1515 East 29th St

↑Address, City and Zip

none

↑Legible Email  
Phone → 360/241/1693

I'm concerned about: \_\_\_\_\_

**RECEIVED**

DEC 17 2013

**ENERGY FACILITY SITE  
EVALUATION COUNCIL**

**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

**No Oil Terminal in Vancouver**  
To the Energy Facilities Site Evaluation Council (EFSEC) and Governor Inslee.

I urge you to assess the full impact of Tesoro Savage's proposal to bring 360,000 barrels of crude oil each day by rail through the Columbia River Gorge National to a shipping terminal in Vancouver. This project comes at a steep price for rail communities and yet offers few jobs in return.

Two oil trains have already exploded within four months killing 47 people. In the face of those risks, downtown developments in Washougal, Camas, and Vancouver will be less attractive to investors.

The trains will cross dozens of salmon bearing streams. One derailment could destroy our salmon industry for decades.

Accidents happen . . . like the Exxon Valdez. Increased shipping traffic increases the risk.

The jobs of 3000 oystermen in Willapa Bay have already been jeopardized by CO2 emissions. We must not build new oil infrastructure. We don't need the oil. Sixteen models of electric cars are here.

Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's proposal.

Coalition of: Columbia Riverkeeper, Friends of the Columbia Gorge  
And Sierra Club Beyond Oil Vancouver

Cassandra Marshall  
↑Name

521 NE 17<sup>th</sup> Ave Camas WA  
↑Address, City and Zip 98607

cassi.r.marshall@gmail.com  
↑Email

I'm concerned about: The safety impacts and possibility of more explosions. Also, the severe impacts of climate change that will come as a result to greater CO2 emissions.

**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

**No Oil Terminal in Vancouver**  
To the Energy Facilities Site Evaluation Council (EFSEC) and Governor Inslee.

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Coalition of: Columbia Riverkeeper, Friends of the Columbia Gorge  
And Sierra Club Beyond Oil Vancouver

Tenley Sheesley  
↑Name

Camas WA  
↑Address, City and Zip

↑Email  
I'm concerned about: the dangers of global warming.

the harm that will come to Camas.

RECEIVED

DEC 17 2013

**ENERGY FACILITY SITE EVALUATION COUNCIL**  
**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

Tesoro Savage CBR  
Scoping Comment  
#30747

Tesoro Savage CBR  
Scoping Comment  
#30748

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Sponsored by: Columbia Riverkeeper, Friends of the Columbia Gorge and Sierra Club Beyond Oil SW Washington

NOAH WESTON

↑Name

15720 NEAS AVE VANCOUVER, WA 98686

↑Address, City and Zip

↑Legible Email

Phone → 1-(360)-241-7388

I'm concerned about: CONTAMINATION

RECEIVED

DEC 17 2013

ENERGY FACILITY SITE  
EVALUATION COUNCIL

**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

Tesoro Savage CBR  
Scoping Comment  
#30749

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Based on the far reaching impacts of this project, I urge you to deny Tesoro Savage's proposal.

Sponsored by: Columbia Riverkeeper, Friends of the Columbia Gorge and Sierra Club Beyond Oil SW Washington

JOSH MATHEWS

↑Name

2810 NE 145th Cir. Vancouver, WA 98686

↑Address, City and Zip

↑Legible Email

Phone → +1 (360) 718-7339

I'm concerned about: POISON CONTROL AND

CONTAMINATION IN OUR WATER.

**To the signer:** Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.



Tesoro Savage CBR  
Scoping Comment  
#30750

**No Oil Terminal in Vancouver**

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RECEIVED

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Tesoro Savage CBR  
Scoping Comment  
#30751

Coalition of: Columbia Riverkeeper, Friends of the Columbia Gorge  
And Sierra Club Beyond Oil Vancouver

Ryan Gunther

↑Name

4518 NW Aspen St. Camas WA

↑Address, City and Zip

ryangunther@comcast.net

↑Email

I'm concerned about: I'm concerned

about how increased train

traffic in Southwest Washington

could put Clark & Skamania

county at risk with derailments.

The Pacific Northwest is a

beautiful place. Keep it that way.

To the signer: Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.

Coalition of: Columbia Riverkeeper, Friends of the Columbia Gorge  
And Sierra Club Beyond Oil Vancouver

Bobbi Honts

↑Name

CAMAS WA

↑Address, City and Zip

camasbobbi@gmail.com

↑Email

I'm concerned about: The negative <sup>of climate</sup> environmental impacts change

that will make the world dangerous for my grandkids.

Also, the dangers of oil

when it comes to safety,

like explosions.

To the signer: Your contact information allows the local environmental coalition to notify you of future hearings related to oil trains traversing Clark County.