



DEPARTMENT OF
ECOLOGY
State of Washington

Crude Oil Movement by Rail and Pipeline

*Quarterly Report: July 1, 2017 through September 30,
2017*

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Spill Prevention, Preparedness, and Response Program
Washington State Department of Ecology
Olympia, Washington

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Introduction

To enhance crude oil spill preparedness and response in Washington State, on August 24, 2016, Ecology adopted the rule, [Oil Movement by Rail and Pipeline Notification](#). The rule establishes reporting standards for facilities that receive crude oil by rail and pipelines that transport crude oil in or through the state.¹ Additionally, the rule identifies reporting standards for Ecology to share information with emergency responders, local governments, tribes, and the public.

This rule is the result of 2015 Legislative direction to provide a better understanding of the changing risk picture for crude oil transported in Washington State as a result of the introduction of crude oil transport by rail and the associated changes in both the volume and properties of crude moving through Washington.

Timely notice of oil movement information is necessary for emergency responders and planners to effectively prepare for and respond to oil spills and other incidents associated with transporting crude oil by rail and pipeline. Providing adequate information about the dates, routes, and properties of crude oil can help protect people living and working near railroads and pipelines, the economy, and environmental resources of Washington State.

Ecology is required to publish information collected under the rule to its website on a quarterly basis. The quarterly reports provide:

- Aggregated information on crude oil transported by rail to facilities in Washington.
- Information about crude oil movement by pipeline in or through the state.
- Reported spills during transport and delivery of crude by rail and pipeline.
- Volume of crude oil transported by vessel.

The reports are intended to inform the public about the nature of crude oil movement through their communities.

The reporting period for this quarterly report is July 1, 2017 through September 30, 2017.

¹ Chapter 173-185 WAC

Crude Oil by Rail Summary

Movement of crude oil by rail in Washington State began in 2012 and has continued to increase since that time. Rail routes transporting crude oil enter the state from Idaho near Spokane and from British Columbia near Bellingham, and Ecology continues to monitor other potential routes. Large segments of the rail routes travel along the I-5 corridor, and cross or run next to major waterways, including the Columbia River and Puget Sound. (See [Appendix 1](#) for a map of railroad routes in the state.)

Capturing information on the properties of crude oil, the volume transported, and the routes used to transport it allows for proper planning, placement of resources, and opportunities to provide detailed information to responders in the event of a spill, ensuring a more effective overall response. The rule directs Ecology to gather this information by requiring facilities receiving crude oil by rail to report all scheduled crude oil deliveries to be received by the facility each week for the succeeding seven-day period. Facilities enter this information into Ecology's Advance Notice of Transfer (ANT) database.

Information reported by facilities on scheduled crude oil deliveries includes the region of origin of crude oil, the railroad route taken to the facility within the state (if known), scheduled time and volume in barrels (bbls) of the delivery, and gravity of the oil. Ecology uses the standard American Petroleum Institute (API) gravity ranges to define the Crude Type in the ANT database. (See [Appendix 2](#) for the API gravity definition and Crude Type ranges.)

Ecology is required to aggregate the information provided on a statewide basis by route, week, and type of crude oil. Aggregate information from the ANT database is provided in [Table 1](#) for the period July 1, 2017 through September 30, 2017, representing the 3rd quarter of 2017. Each week is numbered by calendar week and is aggregated by route and type of crude. The information provided includes:

- Total weekly volume in barrels (bbls) of crude oil transported by rail
- Route
- Region of origin
- Crude type
- Route volume
- Estimated number of railcars per route delivering crude oil (assumes each car holds 680 bbls)

Fourteen calendar weeks are reported in the 3rd quarter of 2017 starting at calendar week 26 and ending at calendar week 39.

Table 1: Crude Oil Movement by Rail**Week 26**

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
26	1A, 2, 3, 4	North Dakota	Light Crude	65,000	95
	1A, 2, 3, 4, 5	North Dakota	Light Crude	71,500	105
	Weekly totals:			136,500	200

* Week 26 contains only one day of reported ANT volumes due to the dates of the reporting period.

Week 27

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
27	1A, 2, 3	North Dakota	Light Crude	65,000	95
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	512,000	752
	1B, 2, 3	North Dakota	Light Crude	63,697	93
	5	Alberta	Light Crude	60,000	88
	Weekly totals:			1,090,697	1,601

Week 28

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
28	1A, 2, 3	North Dakota	Light Crude	129,661	190
	1A, 2, 3, 4	North Dakota	Light Crude	325,000	477
	1A, 2, 3, 4, 5	North Dakota	Light Crude	286,000	420
	1B, 2, 3	North Dakota	Light Crude	64,173	94
	4, 5	Alberta	Heavy Crude	61,248	90
	Weekly totals:			866,082	1,271

Week 29

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
29	1A, 2, 3	North Dakota	Light Crude	65,094	95
	1A, 2, 3, 4	North Dakota	Light Crude	455,000	669
	1A, 2, 3, 4, 5	North Dakota	Light Crude	364,000	535
	1B, 2, 3	North Dakota	Light Crude	64,164	94
	4, 5	Alberta	Heavy Crude	61,173	89
	Weekly totals:			1,009,431	1,482

Week 30

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
30	1A, 2, 3	North Dakota	Light Crude	64,815	95
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	505,500	743
	1B, 2, 3	North Dakota	Light Crude	63,941	94
	4, 5	Alberta	Heavy Crude	61,160	89
	Weekly totals:			1,085,416	1,594

Week 31

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
31	1A, 2, 3	North Dakota	Light Crude	65,000	95
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	296,500	436
	1B, 2, 3	North Dakota	Light Crude	128,119	188
	4, 5	Alberta	Heavy Crude	61,888	91
	5	Alberta	Light Crude	60,000	88
Weekly totals:				1,001,507	1,471

Week 32

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
32	1A, 2, 3	North Dakota	Light Crude	65,000	95
	1A, 2, 3, 4	North Dakota	Light Crude	260,000	382
	1A, 2, 3, 4, 5	North Dakota	Light Crude	506,500	744
	4, 5	Alberta	Heavy Crude	123,129	181
	5	Alberta	Heavy Crude	66,000	97
	Weekly totals:				1,020,629

Week 33

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
33	1A, 2, 3	North Dakota	Light Crude	68,778	101
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	429,000	630
	1B, 2, 3	North Dakota	Light Crude	63,778	93
	4, 5	Alberta	Heavy Crude	122,186	179
	Weekly totals:				1,073,742

Week 34

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
34	1A, 2, 3	North Dakota	Light Crude	64,806	95
	1A, 2, 3, 4	North Dakota	Light Crude	325,000	477
	1A, 2, 3, 4, 5	North Dakota	Light Crude	505,600	743
	1B, 2, 3	North Dakota	Light Crude	64,475	94
	Weekly totals:				959,881

Week 35

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
35	1A, 2, 3	North Dakota	Light Crude	65,071	95
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	507,500	746
	4, 5	Alberta	Heavy Crude	60,966	89
	Weekly totals:				1,023,537

Week 36

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
36	1A, 2, 3	North Dakota	Light Crude	65,000	95
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	343,000	504
	1B, 2, 3	North Dakota	Light Crude	64,352	94
	4, 5	Alberta	Heavy Crude	62,000	91
	5	Alberta	Light Crude	143,000	210
Weekly totals:				1,067,352	1,567

Week 37

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
37	1A, 2, 3	North Dakota	Heavy Crude	64,980	95
	1A, 2, 3	North Dakota	Light Crude	65,686	96
	1A, 2, 3, 4	North Dakota	Light Crude	390,000	573
	1A, 2, 3, 4, 5	North Dakota	Light Crude	419,500	616
	4, 5	Alberta	Heavy Crude	62,000	91
	5	Saskatchewan	Light Crude	63,000	92
Weekly totals:				1,065,166	1,563

Week 38

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
38	1A, 2, 3	North Dakota	Heavy Crude	65,000	95
	1A, 2, 3	North Dakota	Light Crude	65,482	96
	1A, 2, 3, 4	North Dakota	Light Crude	455,000	669
	1A, 2, 3, 4, 5	North Dakota	Light Crude	500,500	736
	1B, 2, 3	North Dakota	Light Crude	64,000	94
	4, 5	Alberta	Heavy Crude	62,000	91
Weekly totals:				1,211,982	1,781

Week 39

Calendar Week#	Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
39	1A, 2, 3	North Dakota	Light Crude	65,332	96
	1A, 2, 3, 4	North Dakota	Light Crude	397,000	583
	1A, 2, 3, 4, 5	North Dakota	Light Crude	562,775	827
	1B, 2, 3	North Dakota	Light Crude	65,270	95
	4, 5	Alberta	Heavy Crude	60,919	89
Weekly totals:				1,151,296	1,690

Note: The data provided in Table 1 was reported to Ecology by the receiving facility into the ANT database as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

Quarter 3 Total Volume (bbls):

13,763,218

A summary of the data shows:

- Three regions of origin were reported: Alberta, North Dakota, and Saskatchewan.
- Two types of crude oil were reported: heavy and light.
- Routes 1A, 1B, and 2 through 5 were used to transport crude by rail.
- The total volume of crude oil transported by rail during the quarter was 13,763,218 barrels (578,055,156 gallons).
- The average weekly volume of crude oil transported by rail was 1,058,709 barrels (44,465,781 gallons).²
- The total number of rail cars moving crude oil by rail was 20,207 cars.
- The average number of rail cars per week moving crude oil by rail was 1,554 cars.³
- 7.2% of crude oil transported by rail was heavy crude and 92.8% was light crude.
- North Dakota was the region of origin for 91.3% of crude oil transported by rail. Alberta was the region of origin for 8.2% of crude oil transported by rail, and Saskatchewan was the region of origin for 0.5% of crude oil transported by rail.

Figure 1 shows the weekly total volumes of crude transported by rail for each calendar week in the 3rd quarter of 2017.

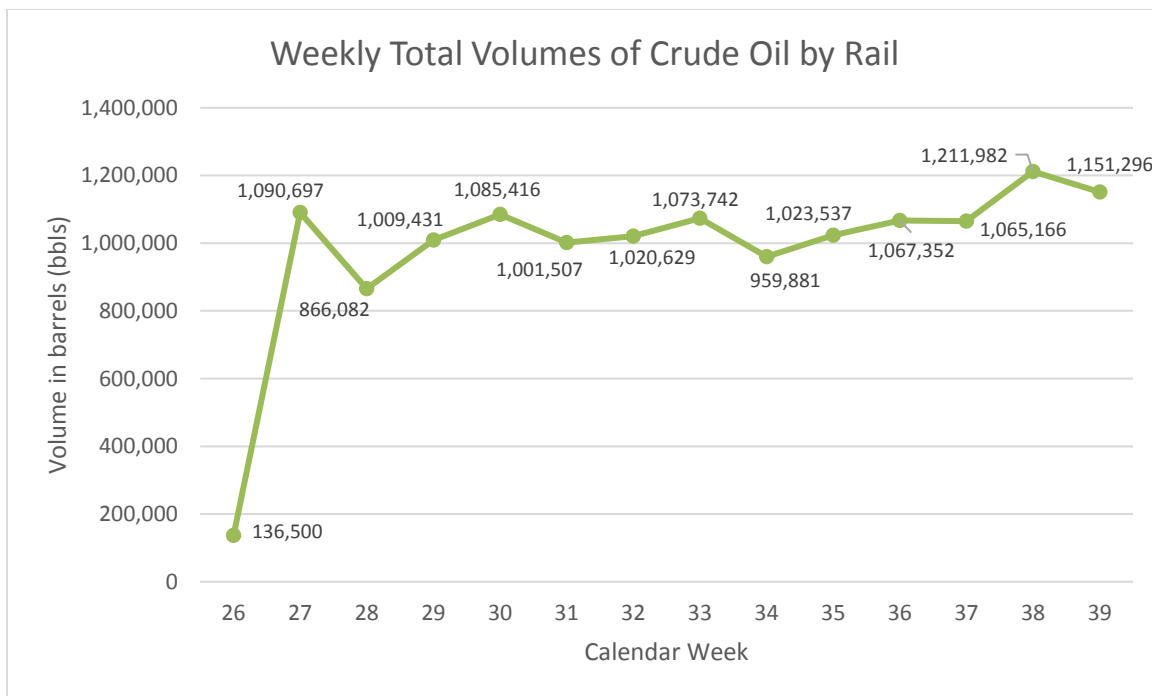


Figure 1: Weekly Total Volumes of Crude Oil by Rail for the 3rd Quarter of 2017

² The quarterly average was calculated using 13 calendar weeks instead of 14 calendar weeks because Calendar Week 26 contains only one day of reported ANT volumes due to the dates of the reporting period.

³ The quarterly average was calculated using 13 calendar weeks instead of 14 calendar weeks because Calendar Week 26 contains only one day of reported ANT volumes due to the dates of the reporting period.

The lowest weekly volume that included a full week of reported advance notice of transfers was 866,082 barrels (36,375,444 gallons) in Week 28. The highest weekly volume of crude transported by rail was 1,211,982 barrels (50,903,244 gallons) in Week 38.

Crude Oil by Pipeline Summary

Pipelines exist inland and may be located near waterbodies and populated areas. Knowing the types and quantities of crude oil transported through pipelines in Washington State helps Ecology properly plan for and execute a rapid, aggressive, and well-coordinated response to a spill.

Under the rule, transmission pipelines that transport crude oil in or through the state must provide Ecology biannual notice of all crude oil transported in or through the state.⁴ Biannual notice must be submitted each year by July 31 for the period from January 1 through June 30 and by January 31 for the period from July 1 through December 31. Biannual notice provided by pipelines includes contact information for the pipeline and the total volume of crude oil transported in or through the state during the reporting period by state or province of origin.

The most recent biannual notices from pipelines were submitted to Ecology by July 31, 2017, and covered the period from January 1, 2017 through June 30, 2017. [Table 2](#) below provides the total volume of crude oil transported in or through the state by pipelines during this period.

Table 2: Crude Oil Movement by Pipeline

State or Province of Origin	Volume (bbls)
Alberta	29,454,561

Note: The data provided in Table 2 was reported to Ecology by the pipelines transporting crude oil in or through the state, as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

The next biannual notices from pipelines will cover the period from July 1, 2017 through December 31, 2017 and must be submitted to Ecology by January 31, 2018.

⁴ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

Crude Oil Spills – Rail and Pipeline

Oil spills can have significant impacts to the public, environment, and economy. Ecology strives to protect Washington’s environment, economy, and public health and safety through a comprehensive spill prevention, preparedness, and response program.

The rule directs Ecology to provide the number and volume of spills to the environment during the transport and delivery of crude oil by rail and pipeline in each quarterly report.⁵ For the period of July 1, 2017 through September 30, 2017, zero crude oil spills to the environment were reported. In the event there are spills to report in the future, Ecology will provide this information and include the date of the spill, the county where the spill occurred, the source, material, and volume of the spill.

⁵ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

Crude Oil Movement by Vessel

In 2006, the state adopted rules for advance notice of oil transfers for vessels and facilities. Ecology has been receiving advance notice of transfer data for all transfers to or from vessels in Washington State since that time.

In order to provide a full picture of crude oil movement in Washington State, a summary of crude oil movement by vessel is provided below, which is in addition to the requirement for this quarterly report as described in the rule.⁶

Table 3 below provides the total volume of crude oil in barrels of inbound and outbound vessel transfers for the period of July 1, 2017 through September 30, 2017. Inbound vessel transfers refers to crude oil movement from vessels to facilities, while outbound vessel transfers refers to crude oil movement from facilities to vessels.

Table 3: Crude Oil Movement by Vessel

Vessel Transfers	Volume (bbls)
Inbound	26,776,022
Outbound	1,353,686

Note: The data provided in Table 3 was reported to Ecology into the ANT database as required by Chapter 173-180 WAC and Chapter 173-184 WAC. Ecology cannot confirm the data or verify its accuracy.

A summary of vessel transfer data for the quarter shows:

- The total volume of crude oil transferred to or from vessels for the 3rd quarter of 2017 was 28,129,708 barrels (1,181,447,736 gallons).
- The total volume of crude oil transferred inbound from vessels to facilities was 26,776,022 barrels (1,124,592,924 gallons).
- The total volume of crude oil transferred outbound from facilities to vessels was 1,353,686 barrels (56,854,812 gallons).
- There were 83 total vessel transfers of crude oil (inbound or outbound).
- The average volume of crude oil transferred to or from vessels per week was 2,163,824 barrels (90,880,608 gallons).⁷

⁶ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

⁷ The quarterly average was calculated using 13 calendar weeks instead of 14 calendar weeks because Calendar Week 26 contains only one day of reported ANT volumes due to the dates of the reporting period.

An Overview of Crude Oil Movement in Washington

A broad view of crude oil movement in Washington State can be seen when comparing the movement of crude oil transported into the state by vessel, rail, and pipeline.

Figure 2 shows the estimated percentage of crude oil transported by vessel (inbound only), rail, and pipeline for four quarters, covering the period of October 1, 2016 through September 30, 2017.*

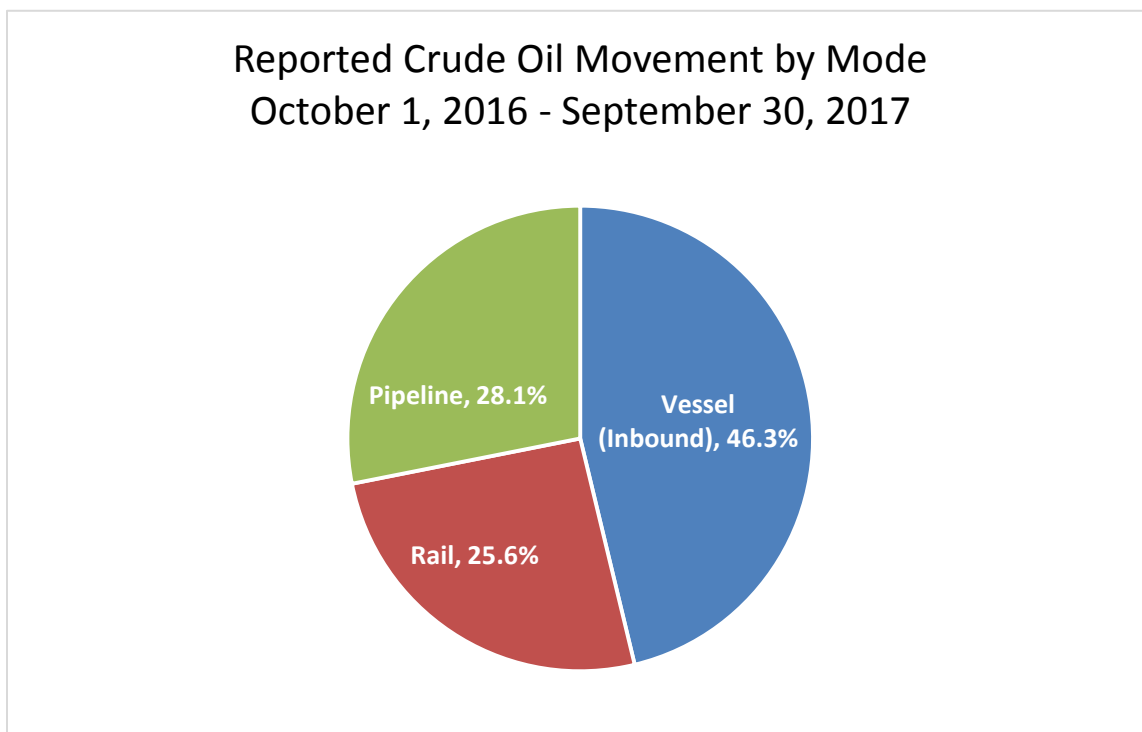


Figure 2: Reported Crude Oil Movement by Mode

**Note: Because pipelines provide biannual notice containing six months of data from January 1 through June 30 and from July 1 through December 31 each year, Ecology assumes oil moved by pipeline is relatively consistent each month for the purpose of Figure 2. Based on that assumption, Ecology calculated an estimate for crude oil movement by pipeline for the period.*

Between October 1, 2016 and September 30, 2017, vessels were responsible for 46.3% of reported crude oil movement into the state, while rail was responsible for 25.6% and pipeline for 28.1%.

Ecology will continue to receive information about crude oil movement and use the data to summarize trends and changes over time.

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Appendix 1 – Washington Railroad Routes

Railroad Routes



Appendix 2 – API Gravity and Crude Oil Types

Information reported by facilities on scheduled crude oil deliveries includes the gravity of the oil. Ecology uses the standard American Petroleum Institute gravity (API gravity) ranges to define the Crude Type in the ANT database.

API gravity is the measure of the density of petroleum liquid in relation to the density of water and is used to classify oils as light, medium, heavy and extra heavy. The lower the API gravity, the more likely it is to sink in water. Crude Type by API gravity is shown in the table below.

Table 4: Crude Type by API Gravity

Crude Type	API Gravity Range
Light Crude	31.2-50 API
Medium Crude	22.3-31.1 API
Heavy Crude	10-22.2 API
Extra Heavy Crude	0-9.9 API