infeasible to be used the Facility due to factors such as cost, availability, accessibility, fractional properties that are incompatible with the range of crudes that the Facility is designed to process, or chemical properties, such as excessive acidity that would damage certain Facility processing units.

4.3.1 Modernization Project-Related Cases

This section summarizes the URM analysis of a range of project cases that are representative of potential crude oil blends and gas oils that could be run by the refinery post-Modernization Project, and assumes that the Facility operates at 93% and 100% of the permitted capacity of the crude and gas oil gateway units and after the Modernization Project improvements have been completed. The analysis is conservative because the Facility utilized only 89% of the crude unit capacity on an average daily basis over the Baseline Period,[12] and refineries cannot practicably operate crude and gas oil processing units at 100% of capacity for more than short intervals of time.

Four representative crude blends were analyzed at both the 93% and 100% utilization levels, including:

1. A "project crude blend" case with a higher sulfur content than the Baseline Period blend (2.5% versus 1.58% during the Baseline Period) and an API gravity that is slightly lower than the Baseline Period (31.6° API versus 33.7° API during the Baseline Period;
2. A "lightest crude blend" case with the highest API that can achieve the specified 93% and 100% utilization rates without exceeding the NHT unit's processing capacity;
3. A "heaviest crude blend" case with the lowest API that can achieve the specified 93% and 100% utilization rates without exceeding the SDA unit's processing capacity; and
4. A "most sour crude blend" case that can achieve the specified 93% and 100% utilization rates and that would recover sulfur in an amount that approximates the maximum SRU limit of 900 lt/d that is part of the Modernization Project.

The crude oil blends that were used in each case were identified by considering a range of potential crude oil supplies, and optimizing the crude blends to meet the specific 93% and 100% Utilization scenarios and that contain sulfur in amounts consistent with the Modernization Project's objective of increasing the

[12] As discussed in Attachment 5, on an average daily basis the Facility utilized 76% of the crude unit during 2011.

sulfur processing capacity of the Facility. Potential crude oil blends that generate significantly less sulfur than the Facility's current processing capacity of 600 lt/d, for example, could be used under current conditions and without upgrading the SRU and related facilities as proposed by the Modernization Project. Crude oils that, for reasons including cost, accessibility, reliability and chemistry (such as excessive acidity) that are highly unlikely or that cannot reliably be used by the Facility as currently configured were also not considered because such crudes are not representative of crude oil feedstocks that might be used under reasonably foreseeable post-Modernization Project operating conditions.

Table A4.3-URM-16 summarizes the crude oil blends used in the URM analysis of reasonably foreseeable future operations at 93% utilization of the crude and gas oil gateway unit capacity.

TABLE A4.3-URM-16 CRUDE OIL BLENDS, 93% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION (BARRELS PER DAY)

Crude Oil Source	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Arab Light	96,910	-	180,100	-
Basrah	142,290	127,200	-	228,200
Bakken	-	112,000	-	-
Eocene	-	-	59,100	11,000
TOTAL	**239,200**	**239,200**	**239,200**	**239,200**

Note: All numbers rounded to 100.

As discussed in Section II, the URM requires several inputs, including the level of crude and gas oil gateway unit capacity utilization, and crude oil fractions and crude and gas oil sulfur content information based on assay data. Table A4.3-URM-17 summarizes the inputs used in the URM analysis of reasonably foreseeable future operations at 93% utilization of the crude and gas oil gateway unit capacity.

Table A4.3-URM-18 summarizes the amount of crude oil and purchased gas oil, and the average daily unit rates (b/d processed by each unit) for each of the four representative cases assuming 93% utilization of the crude and gas oil gateway unit capacity.

TABLE A4.3-URM-17 URM INPUTS, PROJECT-RELATED CASES, 93% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	93%	93%	93%	93%
Crude Oil Fractions (% Each Boiling Point Range from Assay Data, °F)				
Butane and Lighter Fractions	1.93	2.53	1.29	2.16
Naphtha (55-290)	17.36	21.01	14.87	16.85
Kerosene (290-510)	21.11	23.17	20.04	19.87
Diesel (510-625)	10.62	10.85	10.76	10.14
Gas Oil (625-770)	12.58	11.93	13.13	12.03
Heavy Oil (770-1020)	18.11	16.65	19.01	18.07
Residuum (1020+)	18.30	13.87	20.90	20.91
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)				
Crude Oil API Gravity (degrees)	31.6	35.3	29.2	30.0
Crude Oil Specific Gravity	0.868	0.848	0.881	0.876
Crude Oil Sulfur Content	2.50	1.68	2.61	2.98
Sour Gas Oil Sulfur Content	2.25	2.25	2.25	2.25
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	55	55	55	60

TABLE A4.3-URM-18 URM PROJECT-RELATED CASE CALCULATIONS, 93% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Crude and Purchased Gas Oil Use (b/d				
Crude Oil	239,200	239,200	239,200	239,200
Sweet Gas Oil	3,700	3,700	3,700	3,700
Sour Gas Oil	50,000	62,600	42,000	46,900
TOTAL	292,900	305,500	284,900	289,800

TABLE A4.3-URM-18 URM PROJECT-RELATED CASE CALCULATIONS, 93% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Refinery Unit Rates (b/d)				
Crude Unit– Atmospheric Column	239,200	239,200	239,200	239,200
Crude Unit - Vacuum Column	106,700	91,600	115,900	111,900
NHT	48,500	57,600	42,400	47,100
Catalytic Reformers	45,500	51,300	41,500	44,500
Pen/Hex Isomerization Unit	25,200	29,400	22,300	24,500
JHT	60,800	65,800	58,300	57,800
DHT	29,900	30,500	30,300	28,800
FCC	74,400	74,400	74,400	74,400
FCC FHT	74,400	74,400	74,400	74,400
GHT	18,200	18,200	18,200	18,200
Alkylation Unit	25,800	25,800	25,800	25,800
Polymerization Unit	7,100	7,100	7,100	7,100
Hydrocracker	47,700	47,700	47,700	47,700
Richmond Lube Oil Plant (RLOP)				
LNC – light neutral hydrocracker	15,300	15,300	15,300	15,300
LNF – light neutral hydrofinisher	20,500	20,500	20,500	20,500
HNC – heavy neutral hydrocracker	24,200	24,200	24,200	24,200
HNF – heavy neutral hydrofinisher	11,200	11,200	11,200	11,200
Solvent De-Asphalting (SDA) Unit	43,800	33,200	50,000	50,000
Sulfur Recovery Unit (SRU)(lt/day)	749	587	758	834
Hydrogen Plant production (mmscfd)	197	178	202	205

Note: Numbers rounded to 100.

As shown in Table A4.3-URM-18, the crude and gas oil gateway units (the FCC, FCC FHT, hydrocracker, LNC and HNC) each operate at 93% of future utilization capacity (i.e., including Modernization Project-related capacity changes to the FCC FHT). The lightest crude blend case uses all of the capacity of the NHT (57,600 b/d). The heaviest and most sour crude blend cases use the full capacity of the SDA (50,000 b/d). The lightest blend case generates the highest level of

crude and purchased gas oil use, 305,500 b/d compared with project crude blend case crude and gas oil use of 292,900 b/d. Sulfur recovery ranges from 587 lt/d in the lightest crude blend case to 834 lt/d in the most sour crude blend case. The Facility's hydrogen supply from the hydrogen plant (i.e., net of hydrogen obtained from internal processing and recovered from gas fuel) ranges from 178 mmscfd in the lightest crude blend case to 205 mmscfd in the most sour crude blend case.

Table A4.3-URM-19 summarizes the crude oil blends used and Table A4.3-URM-20 summarizes the inputs used in the URM analysis of reasonably foreseeable future operations at 100% of the crude and gas oil gateway unit utilization capacity.

In certain cases, the crude oil blends that allow for Facility operations at 100% of the crude and gas oil gateway unit capacity are different than the comparable blends in the 93% utilization cases. The amount of heavier blends that the Facility can process, for example, can be constrained by the SDA processing capacity. The Facility can use a crude blend with a greater percentage of residuum at 93% utilization than at 100% utilization. As a result, the heaviest crude blend API at 93% utilization is 29.2° (see Table A4.3-URM-17) compared with 30.3° at 100% utilization (see Table A4.3-URM-20). Due to the lighter fraction processing limit of the NHT, the lightest crude blend API at 100% utilization is 35.0° compared with 35.3 at 93% utilization (see Table A4.3-URM-17)

Table A4.3-URM-21 summarizes the amount of crude oil and purchased gas oil, and the average daily unit rates (barrels per day processed by each unit) for each of the four reasonably foreseeable cases assuming 100% utilization of the crude and gas oil gateway unit capacity.

As shown in Table A4.3-URM-21, the crude and gas oil gateway units (the FCC, FCC FHT, hydrocracker, LNC and HNC) each operate at 100% of future utilization capacity (i.e., including Modernization Project-related capacity changes to the FCC FHT). The lightest crude blend case uses all of the capacity of the NHT (57,600 b/d). The heaviest and most sour crude blend cases use the full capacity of the SDA (50,000 b/d). The lightest blend case generates the highest level of crude and purchased gas oil use, 324,300 b/d compared with crude and purchased gas oil use of 315,200 b/d in the project blend crude case. Sulfur recovery ranges from 600 lt/d in the lightest crude blend case to 869 lt/d in the most sour crude blend case. The Facility's hydrogen supply from the hydrogen plant (i.e., net of hydrogen obtained from internal processing and recovered from gas fuel) ranges from 192 mmscfd in the lightest crude blend case to 217 mmscfd in the most sour crude blend case.

TABLE A4.3-URM-19 CRUDE OIL BLENDS, 100% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION (BARRELS PER DAY)

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Arab Light	104,200	195,200	211,200	39,200
Basrah	153,000	–	–	218,000
Bakken	–	62,000	–	–
Eocene	–	–	46,000	–
TOTAL	**257,200**	**257,200**	**257,200**	**257,200**

TABLE A4.3-URM-20 URM INPUTS, PROJECT-RELATED CASES, 100% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	100%	100%	100%
Crude Oil Fractions (% Each Boiling Point Range from Assay Data, °F)				
Butane and Lighter Fractions	1.93	1.82	1.34	2.12
Naphtha (55-290)	17.36	19.30	15.58	17.34
Kerosene (290-510)	21.11	23.43	20.70	20.55
Diesel (510-625)	10.62	11.34	10.90	10.34
Gas Oil (625-770)	12.58	13.02	13.20	12.23
Heavy Oil (770-1020)	18.11	17.61	18.84	18.00
Residuum (1020+)	18.30	13.48	19.44	19.44
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)				
Crude Oil API Gravity (Degrees)	31.6	35.0	30.3	31.0
Crude Oil Specific Gravity	0.868	0.850	0.875	0.871
Crude Oil Sulfur Content	2.50	1.50	2.42	2.75
Sour Gas Oil Sulfur Content	2.25	2.25	2.25	2.25
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	55	45	50	55

TABLE A4.3-URM-21 URM PROJECT-RELATED CASE CALCULATIONS, 100% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Project Crude Blend	Lightest Crude Blend	Heaviest Crude Blend	Most Sour Crude Blend
Crude and Purchased Gas Oil Use (b/d)				
Crude Oil	257,200	257,200	257,200	257,200
Sweet Gas Oil	4,000	4,000	4,000	4,000
Sour Gas Oil	54,000	63,100	48,400	53,100
TOTAL	315,200	324,300	309,600	314,300
Refinery Unit Rates (b/d)				
Crude Unit – Atmospheric Column	257,200	257,200	257,200	257,200
Crude Unit - Vacuum Column	114,700	101,700	120,500	116,700
NHT	52,200	57,600	47,500	52,000
Catalytic Reformers	48,900	52,300	45,900	48,800
Pen/Hex Isomerization Unit	27,100	29,600	24,900	27,000
JHT	65,500	71,600	64,500	64,100
DHT	32,000	33,900	32,800	31,300
FCC	80,000	80,000	80,000	80,000
FCC FHT	80,000	80,000	80,000	80,000
GHT	19,500	19,500	19,500	19,500
Alkylation Unit	27,700	27,700	27,700	27,700
Polymerization Unit	7,600	7,600	7,600	7,600
Hydrocracker	51,300	51,300	51,300	51,300
Richmond Lube Oil Plant (RLOP)				
LNC – light neutral hydrocracker	16,500	16,500	16,500	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000	12,000
Solvent De-Asphalting (SDA) Unit	47,100	34,700	50,000	50,000
Sulfur Recovery Unit (SRU)(lt/day)	806	600	794	869
Hydrogen Plant production (mmscfd)	211	192	214	217

Note: Numbers rounded to nearest 100.

The URM analysis of the project, heavier, lighter and more sour crude cases at 93% and 100% of crude and gas oil gateway unit utilization capacity consider crude oil blends that range from 29.6° to 35.3°, crude oil sulfur content from 1.50% to 2.98% by weight, and total crude and purchased gas oil use of 284,900 b/d to 324,300 b/d (see Tables AQ-URM-17 to AQ-URM-18 and Tables AQ-URM-20 to AQ-URM-21). Emissions estimates for each of these cases have been prepared and are included in the Modernization Project EIR. To provide a conservative assessment, the EIR further analyzes each of these cases assuming that the hydrogen plant uses any excess production capacity above the Facility's demand as calculated by the URM and operates at 100% of proposed permitted utilization capacity. Health risk assessments have been prepared and are included in the EIR for the project crude blend and lightest crude blend cases assuming the hydrogen plant operates at 100% utilization, which is above the levels calculated by the URM for these cases.

4.3.2 Very Heavy, Very Light and Maximum Sulfur Cases

This section summarizes the URM analysis of very heavy, very light and maximum sulfur content crude cases. The purpose of this analysis is to show how the Facility processing units, the SRU and the hydrogen plant would operate in the event that the Facility used much heavier, much lighter and more sour crude oil than would occur under representative future conditions. As shown in Table A4.3-URM-22, each is based on a crude oil blend that facilitates the URM analysis of the operational consequences of processing very heavy, very light, and very sour crude oil.

TABLE A4.3-URM-22 CRUDE OIL BLEND, VERY HEAVY, VERY LIGHT AND MAXIMUM SULFUR CASES (BARRELS PER DAY)

	Very Heavy	Very Light	Maximum Sulfur
Arab Light	-	-	39,200
Basrah	-	-	218,000
Bakken	-	199,300	-
Eocene	135,000	-	-
TOTAL	**135,000**	**199,300**	**257,200**

Note: Numbers rounded to nearest 100.

Table A4.3-URM-23 summarizes the inputs used in the URM analysis of the very heavy, very light and maximum sulfur crude cases. The API of the very heavy crude oil is approximately 18.3° and the API of the very light crude oil is approximately 41°. These crude blends are substantially heavier and lighter than

the average gravity of the Baseline Period crude blends (API=33.7º) and the representative project crude blend at 93% capacity (31.6º; see Table A4.3-URM-17). All three cases assume that the crude and gas oil gateway units will operate at 100% of capacity unless constrained by one or more Facility processing unit limits.

TABLE A4.3-URM-23 URM INPUTS, VERY HEAVY, VERY LIGHT, AND MAXIMUM SULFUR CASES

	Very Heavy	Very Light	Maximum Sulfur
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	100%	100%
Crude Oil Fractions (% Each Boiling Point Range from Assay Data, ºF)			
Butane and Lighter Fractions	0.67	2.87	2.12
Naphtha (55-290)	7.07	25.20	17.33
Kerosene (290-510)	12.72	26.54	20.55
Diesel (510-625)	9.24	11.61	10.34
Gas Oil (625-770)	12.30	11.82	12.23
Heavy Oil (770-1020)	20.98	15.20	17.99
Residuum (1020+)	37.02	6.77	19.44
Feedstock Input Characteristics (% Weight)			
Crude Oil API Gravity (degrees)	18.3	41.0	31.0
Crude Oil Specific Gravity	0.945	0.820	0.871
Crude Oil Sulfur Content	4.57	0.20	2.75
Sour Gas Oil Sulfur Content	2.25	2.25	2.66
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	65	20	55

Table A4.3-URM-24 summarizes the amount of crude oil and purchased gas oil, and the average daily unit rates (barrels per day processed by each unit) for the very heavy, very light and maximum sulfur crude cases assuming 100% utilization of the crude and gas oil gateway unit capacity.

TABLE A4.3-URM-24 URM VERY HEAVY, VERY LIGHT, AND MAXIMUM SULFUR CASE CALCULATIONS 100% CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	Very Heavy	Very Light	Maximum Sulfur
Crude and Purchased Gas Oil Use (b/d)			
Crude Oil	135,000	199,300	257,200
Sweet Gas Oil	4,000	4,000	4,000
Sour Gas Oil	85,900	103,200	53,000
Total	**224,900**	**306,500**	**314,200**
Refinery Unit Rates (b/d)			
Crude Unit – Atmospheric Column	135,000	199,300	257,200
Crude Unit - Vacuum Column	89,000	59,100	116,700
NHT	14,600	57,600	52,000
Catalytic Reformers	24,800	52,400	48,800
Pen/Hex Isomerization Unit	9,500	29,700	27,016
JHT	27,900	64,000	64,100
DHT	17,200	27,900	31,300
FCC	80,000	80,000	80,000
FCC FHT	80,000	80,000	80,000
GHT	19,500	19,500	19,500
Alkylation Unit	27,700	27,700	27,700
Polymerization Unit	7,600	7,600	7,600
Hydrocracker	51,300	51,300	51,300
Richmond Lube Oil Plant (RLOP)			
LNC – light neutral hydrocracker	16,500	16,500	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000
Solvent De-Asphalting (SDA) Unit	50,000	13,500	50,000
Sulfur Recovery Unit (SRU)(lt/day)	891	376	900
Hydrogen Plant production (mmscfd)	228	167	219

Note: Numbers rounded to nearest 100.

The URM results for the very heavy case results show that the Facility is unable to utilize the full capacity of the crude unit (257,200 b/d) when the crude oil blend feedstock contains more than 50,000 b/d of residuum. All of the residuum that enters the Facility is processed by the SDA which, due to equipment limitations and other factors operates at an annual average throughput of 50,000 b/d, less than the current permitted capacity of 56,000 b/d. The project will lower the annual average throughput permit limits to 50,000 b/d. As shown in Table A4.3-URM-23, assay data indicates that Eocene crude oil contains approximately 37% of the residuum fraction by volume. The SDA processing limit would be reached for Eocene crude use of approximately 135,000 b/d. In general, the URM results indicate that the Facility cannot utilize the full capacity of the crude unit for any crude oil blend that contain more than approximately 19.44% residuum by volume. Crude oil blends that are significantly heavier than the representative project crude blend case (31.6°; see Tables AQ-URM-17 and AQ-URM-20) and the average Baseline Period crude blend (33.7° API) usually contain more than 19.44% of residuum by volume.

The very heavy crude case results also indicate that Facility processing of heavier crude blends with relatively high sulfur content would also tend to be constrained by the maximum SRU processing limit of 900 lt/d. As shown in Table A4.3-URM-23. Eocene crude oil has a comparatively high sulfur content of approximately 4.57% by weight. Even if Eocene crude oil contained less residuum, the Facility could not process more than 135,000 b/d without exceeding the SRU processing limit. The URM results indicate that the Facility's capacity to process high sulfur content and heavier crude would tend to be constrained by either or both the SDA and the SRU processing limits.

The URM results for the very light case show that the Facility is unable to utilize the full capacity of the crude unit (257,200 b/d) when the naphtha in the crude oil blend feedstock, plus internal refinery flows to the NHT, exceed 57,600 b/d. All of the naphtha that enters the Facility, and a small amount of naphtha produced by other Facility units, is processed by the NHT which has a maximum capacity of 57,600 b/d. As shown in Table A4.3-URM-23, assay data indicates that Bakken crude oil contains approximately 25.2% of the naphtha fraction by volume. The NHT processing limit would be reached for Bakken crude volumes of approximately 199,300 b/d plus internal Facility feeds to the unit.

The URM results for the maximum sulfur case analyze how the Facility would operate under future conditions in the event that the crude and gas oil feedstocks contain enough sulfur to fully load the SRU (result in 900 lt/d sulfur recovery), and when the crude and gas oil gateway units are run at full capacity.

This case assumes a slightly higher sour gas sulfur content than in the 100% capacity most sour crude blend case in Table A4.3-URM-21 (2.66% versus 2.25% by weight) to result in a sulfur recovery of 900 lt/d[13] in the maximum sulfur case would not exceed the maximum capacity of the SDA or NHT, and the crude unit could be operated at the unit's 257,200 b/d capacity. The total crude and purchased gas oil used by the Facility would be 314,200 b/d, and 219 mmscf of hydrogen would be supplied to the Facility from the hydrogen plant.

Emissions estimates for the very heavy, very light and maximum sulfur cases summarized in Tables AQ-URM-22 and AQ-URM-24 have been prepared and are included in the Modernization Project EIR.

4.3.3 No-Modernization Project Cases at 93% and 100% Utilization

This section summarizes the URM analysis of Facility operations under no-Modernization Project future conditions and without upgrading the Facility's processing capacity, the hydrogen plant and other improvements proposed by the Modernization Project. The Baseline Period Facility operational results summarized in Table A4.3-URM-3 represent the 89% utilization case under no-Modernization Project conditions. Table A4.3-URM-25 summarizes the URM analysis results for Facility operations at 93% and 100% of crude and gas oil gateway unit capacity under no-Modernization Project conditions and using the Baseline Period crude blend (see Table A4.3-URM-2). The results show that the Facility operations would be constrained by the existing hydrogen plant's net hydrogen output (accounting for 94% output purity) of approximately 170.2 mmscfd. Due to insufficient hydrogen supplies, the FCC FHT and the hydrocracker could not be run at permitted capacity in the 100% utilization scenario, and the FCC FHT could not operate at full capacity in the 93% utilization scenario.[14] As a result, under no-Modernization Project conditions and using the Baseline Period crude blend, the Facility could not process imported gas oil in sufficient amounts to operate the gas oil gateway units at 100% or 93% of utilization capacity.

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[13] The most sour crude blend case in Table A4.3-URM-21 results in the recovery of 869 lt/d of sulfur and a Facility demand from the hydrogen plant of 217 mmscfd. The slightly higher level of sulfur in sour gas oil assumed in the maximum sulfur case results in the recovery of 900 lt/d of sulfur and a Facility demand from the hydrogen plant of 219 mmscfd.

[14] Under no-Modernization Project conditions, the FCC FHT capacity would remain at 65,000 b/d and not increase to 80,000 b/d as proposed by the Modernization Project. The Hydrocracker capacity of 51,300 b/d would not be modified by the Modernization Project.

TABLE A4.3-URM-25 URM ANALYSIS OF NO-PROJECT REFINERY OPERATIONS, 93% AND 100% OF CRUDE AND GAS OIL GATEWAY UNIT UTILIZATION

	100% Utilization	93% Utilization
Crude and Purchased Gas Oil Use (b/d)		
Crude Oil	257,200	239,200
Sweet Gas Oil	49,300	43,200
Sour Gas Oil	6,100	13,800
Total	**312,600**	**296,200**
Refinery Unit Rates (b/d)		
Crude Unit – Atmospheric Column	257,200	239,200
Crude Unit - Vacuum Column	104,600	97,300
NHT	55,300	51,500
Catalytic Reformers	49,100	47,400
Pen/Hex Isomerization Unit	28,300	26,600
JHT	68,200	63,300
DHT	33,400	31,200
FCC FHT	30,800	31,400
FCC	80,000	74,400
GHT	19,500	18,200
Alkylation Unit	26,800	25,800
Polymerization Unit	7,600	7,100
Hydrocracker	45,400	47,700
Richmond Lube Oil Plant (RLOP)		
LNC – light neutral hydrocracker	16,500	15,300
LNF – light neutral hydrofinisher	22,000	20,500
HNC – heavy neutral hydrocracker	26,000	24,200
HNF – heavy neutral hydrofinisher	12,000	11,200
Solvent De-Asphalting (SDA) Unit	38,600	35,900
Sulfur Recovery Unit (SRU)(lt/day)	**438**	**424**
Hydrogen Plant Production (mmscfd)	**170**	**170**

Note: Numbers rounded to nearest 100.

Emissions estimates have been prepared for these cases and are included in the Modernization Project EIR. The No-Modernization Project cases are considered in more detail in the Alternatives section of the Modernization Project EIR.

4.3.4 Limited Sulfur Scenarios at 93% and 100% Utilization

This section summarizes the URM analysis of Facility operations under future conditions that include the proposed Modernization Project improvements at 93% and 100% of the crude and gas oil gateway unit capacity except that the SRU would be limited to 750 lt/d. The crude oil blend used in both of these scenarios is the same as in the 100% and 93% utilization project crude blend cases summarized in Tables AQ-URM-16 and AQ-URM-19. Table A4.3-URM-26 summarizes the fractional properties and sulfur content information input for these cases, which are the same as for the 93% and 100% utilization project crude blend cases in Tables AQ-URM-17 and AQ-URM-19.

TABLE A4.3-URM-26 URM INPUTS FOR LIMITED SULFUR CASES, 100% AND 93% CRUDE AND GAS OIL GATEWAY UTILIZATION, SRU LIMITED TO 750 LT/D

	100% Utilization	93% Utilization
Crude Oil Fractions (% Each Boiling Point Range from Assay Data, °F)		
Butane and Lighter Fractions	1.93	1.93
Naphtha (55-290)	17.36	17.36
Kerosene (290-510)	21.11	21.11
Diesel (510-625)	10.62	10.62
Gas Oil (625-770)	12.58	12.58
Heavy Oil (770-1020)	18.11	18.11
Residuum (1020+)	18.3	18.3
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)		
Crude Oil API Gravity (degrees)	31.6	31.6
Crude Oil Specific Gravity	0.868	0.868
Crude Oil Sulfur Content	2.5	2.5
Sour Gas Oil Sulfur Content	2.25	2.25
Sweet Gas Oil Sulfur Content	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	55	55

Table A4.3-URM-27 summarizes the limited sulfur case analysis results. The reduced 750 lt/d SRU limit would constrain the full use of the crude unit capacity in the 100% case. As a result, only 205,000 b/d of crude oil could be used by the Facility. In contrast, as shown in the 100% utilization project crude blend case in Table A4.3-URM-21, the Facility could use up to 257,200 b/d of crude oil with the same fractional characteristics and sulfur content if the SRU capacity was 900 lt/d. Table A4.3-URM-27 also shows that the crude unit can be operated at 93% of capacity (and with the same unit throughputs summarized for the 93% utilization project crude blend case in Table A4.3-URM-18) because the gas oil gateway units would also be run at 93% of full capacity and less sulfur from gas oil would be brought into the Facility.

Emissions estimates have been prepared for these cases and are included in the Modernization Project EIR. The limited sulfur cases are considered in more detail in the Alternatives section of the Modernization Project EIR.

4.3.5 Other URM Cases

Several URM cases were also developed during the preparation of the Modernization Project EIR with assumed crude oil blends that are highly unlikely to or that cannot reliably be used by the Facility as currently configured, or that have relatively low sulfur contents and are not consistent with Modernization Project objectives. Summaries of 41 of these cases are presented for informational purposes in Attachment 3.

4.4 CONCLUSION

The URM is designed to calculate future refinery unit throughput rates based on potential post-Modernization Project use of crude oil with varying fractional characteristics, crude and gas oil with varying sulfur contents, and varying gas and crude oil import volumes. To provide a conservative assessment, the URM maximizes crude and gas oil inputs to the extent possible subject to applicable unit throughput capacity and permit limits. The URM calculations require that a set of input values be entered into the model that characterize the crude oil's fractional characteristics and weight, and the sulfur content of the crude and purchased gas oil (see Attachment 1). This information would be derived from the applicable assay data. Once the inputs have been entered, the URM calculates the resulting process unit throughput, sulfur recovery amount, and hydrogen plant production levels using the parameters listed in Attachment 2. The URM results were utilized to estimate Facility emissions under post-Modernization Project conditions as a result of the calculated process unit throughput rates for each scenario.

TABLE A4.3-URM-27 URM ANALYSIS OF LIMITED SULFUR (750 LT/D SRU LIMIT) CASES, 93% AND 100% OF CRUDE AND GAS AND GAS OIL GATEWAY UNIT UTILIZATION

	100% Utilization	93% Utilization
Crude and Purchased Gas Oil Use (b/d)		
Crude Oil	205,000	239,200
Sweet Gas Oil	4,000	3,700
Sour Gas Oil	76,900	50,000
Total	**285,900**	**292,900**
Refinery Unit Rates (b/d)		
Crude Unit – Atmospheric Column	205,000	239,200
Crude Unit – Vacuum Column	91,400	106,700
NHT	42,400	48,500
Catalytic Reformers	42,600	45,500
Pen/Hex Isomerization Unit	22,500	25,200
JHT	54,300	60,800
DHT	26,500	29,900
FCC	80,000	74,400
FCC FHT	80,000	74,400
GHT	19,500	18,200
Alkylation Unit	27,700	25,800
Polymerization Unit	7,600	7,100
Hydrocracker	51,300	47,700
Richmond Lube Oil Plant (RLOP)		
LNC – light neutral hydrocracker	16,500	15,300
LNF – light neutral hydrofinisher	22,000	20,500
HNC – heavy neutral hydrocracker	26,000	24,200
HNF – heavy neutral hydrofinisher	12,000	11,200
Solvent De-Asphalting (SDA) Unit	37,500	43,800
Sulfur Recovery Unit (SRU)(lt/day)	**751**	**749**
Hydrogen Plant production (mmscfd)	**208**	**197**

Note: Numbers rounded to nearest 100.

4.5 REFERENCES

Chevron Data Transmittal #1, (Rev #1): BBL Balance, 2014

Chevron Data Transmittal #3C (Rev #2): H2 Plant Production Rates, 2014.

Hogan, Thomas R. 2014. Written communication to Shari Libicki, ENVIRON. February 26.

M.D. Edgar, A.D. Johnson, J.T. Pistorius, and T. Varadi. 1984. "Troubleshooting on Hydrotreating Units," National Petroleum Refiners Association Meeting, paper No. AM-84-38, p. 7.

Robert A Meyers, Handbook of Petroleum Refining Processes, Third Edition, (McGraw-Hill, 2004) page 10.27 and page 14.36.

ATTACHMENTS TO APPENDIX 4.3 - URM

APPENDIX 4.3 - URM

Attachment 1

ATTACHMENT 1
CASE-SPECIFIC URM INPUTS (SPECIFIED OR DERIVED FROM ASSAY DATA FOR EACH CASE)

Crude and Gas Oil Gateway Unit Capacity Utilization	**%**
Crude Oil Fractional Inputs	
Crude Oil Fraction (Boiling Point Range ºF)	**Percent of Crude Blend Volume**
Butane and Lighter Fractions	%
Naphtha (55-290)	%
Kerosene (290-510)	%
Diesel (510-625)	%
Gas Oil (625-770)	%
Heavy Oil (770-1020)	%
Residuum (1020+)	%
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)	
Crude Oil Specific Gravity[a]	[value]
Crude Oil Sulfur Content (wt. %)	%
Sour Gas Oil Sulfur Content (wt. %)	%
Sweet Gas Oil Sulfur Content (wt. %)	%
Percent Crude Oil Sulfur in Residuum Fraction Processed in SDA	%

[a] Gas oil specific gravity is also a treated as a model input and is assumed to be 0.91 for all cases.

APPENDIX 4.3 - URM

Attachment 2

ATTACHMENT 2
URM ANALYSIS PARAMETERS

URM Crude Oil Fraction and Inter-Unit Feed Parameters	
Feed to Vacuum Unit--Percent of Crude Oil Fractions	
Gas Oil Fraction	65%
Heavy Gas Oil Fraction	100%
Residuum Fraction	100%
Feed to Naphtha Hydrotreater—Percent of Crude Oil Fractions or Processing Unit Feed	
Naphtha Fraction	100%
Jet Hydrotreater Feed	6.6%
FCC Feed Hydrotreater Feed	4%
Feed to Catalytic Reformers—Percent of Processing Unit Output	
Naphtha Hydrotreater Feed	64%
Hydrocracker Feed	30%
Feed to Pen/Hex Isomerization Unit—Percent Processing Unit Output	
Naphtha Hydrotreater Feed	36%
Catalytic Reformers Feed	17%
Feed to Jet Hydrotreater—Percent of Crude Oil Fractions or Processing Unit Feed	
Kerosene Fraction (less 1,700 b/d)	100%
LNC Feed	16%
HNC Feed	13%
Diesel Hydrotreater Feed	3.6%
FCC Feed	7.2%
Feed to Diesel Hydrotreater—Percent of Crude Oil Fractions or Processing Unit Feed	
Diesel Fraction (plus 1,700 b/d)	100%
FCC Feed	3.8%
Feed to Alkylation Unit—Percent of Processing Unit Feed	
FCC Feed	25%
Hydrocracker Feed	15%
Feed to Gasoline Hydrotreater from FCC (percent of FCC Feed)	24.4%
Feed to Polymerization Unit from FCC (percent FCC Feed)	9.5%
Percent of Residuum Fraction Feed Solvent De-Asphalting (SDA) Unit	100%

FCC FHT Feed to FCC (percent FCC FHT Feed)	92%
FCC Feed from Heavy Neutral Hydrocracker (HNC) (percent HNC Feed)	9.4%
Hydrocracker Feed from FCC (percent FCC Feed)	5%
Gas Oil Parameters	
Percent Gas Oil Distilled from Atmospheric Crude Unit	35%
Percent Gas Oil Distilled from Crude Vacuum Unit	
Percent Gas Oil Fraction from Crude Vacuum Unit	65%
Percent Gas Oil From Heavy Gas Oil Fraction	100%
Percent DAO Recovered from SDA Feed	72%
Sulfur Calculation Parameters	
Residuum Specific Gravity	1.15
Percent Total Sulfur Routed to SDA that remains in Fuel Oil Blendstock	50%
Percent Sulfur in Sweet Gas Oil	0.25%
Import Gas Oil Specific Gravity	0.91
Percent SDA Feed that is Fuel Oil Blendstock	28%
Baseline Period Sour Gas Oil Sulfur Content	1.5%
Hydrogen Calculation Parameters	
Hydrogen Demand per Barrel by Unit (SCF)	
Naphtha Hydrotreater	95
JHT	145
DHT	425
FCC FHT	-
Purchased gas oil+ gas oil from crude	630
SDA-Produced gas oil + recycled	950
Hydrocracker	2150
GHT	60
Pen/Hex Isomerization Unit	295
Richmond Lube Oil Plant (RLOP)	-
LNC – light neutral hydrocracker	1,100
LNF – light neutral hydrofinisher	150
HNC – heavy neutral hydrocracker	1,100
HNF – heavy neutral hydrofinisher	250

Butamer Unit (mmscfd)	0.3
Hydrogen produced by the Catalytic Reformers (SCF per Barrel)	850
Hydrogen recovered from fuel gas	
Percent of H2 fed to units purged to fuel gas	13%
Percent of H2 in Fuel Gas Stream Recovered for Use	90%
H2 Demand/ Barrel /Percent Difference from Baseline Period Content (SCF)	100

Note: See references section and notes in text for parameter sources.

APPENDIX 4.3 - URM

Attachment 3

ATTACHMENT 3
OTHER URM CASES[15]

	Case #							
	1	2	3	4	5	6	7	8
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	100%	100%	100%	100%	100%	93%	100%
Crude Oil Fractions (% Each Boiling Point Range from Assay Data)								
Butane and Lighter Fractions	0.0	0.7	1.1	1.8	0.9	1.0	0.4	0.8
Naphtha (55-290)	1.0	7.1	6.8	10.3	11.4	11.9	7.7	7.7
Kerosene (290-510)	6.6	12.7	10.4	11.9	12.8	15.9	14.8	15.4
Diesel (510-625)	12.2	9.2	11.8	7.6	8.7	8.3	14.4	11.8
Gas Oil (625-770)	18.8	12.3	17.1	10.4	12.1	10.0	18.1	13.6
Heavy Oil (770-1020)	30.1	21.0	26.1	18.0	19.0	17.7	23.8	22.6
Residuum (1020+)	31.3	37.0	26.8	40.0	35.1	35.2	20.9	28.1
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)								
Crude Oil API Gravity (degrees)	14.4	18.3	19.3	20.6	20.9	21.5	21.6	22.05
Crude Oil Specific Gravity	0.970	0.945	0.939	0.930	0.929	0.925	0.924	0.922
Crude Oil Sulfur Content	1.05	4.57	1.03	4.63	4.68	3.4	0.70	0.74
Sour Gas Oil Sulfur Content	1.50	1.50	1.50	1.50	1.50	1.50	2.25	1.50

[15] These cases use crude oil blends that are highly unlikely to or that cannot reliably be used by the Facility as currently configured, or that have relatively low sulfur content and are not consistent with Modernization Project objectives.

	Case #							
	1	2	3	4	5	6	7	8
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	50	65	50	60	65	65	47	50
Crude and Purchased Gas Oil Use (b/d)								
Crude Oil	159,700	135,000	186,860	125,000	142,500	142,200	239,200	178,000
Sweet Gas Oil	4,000	4,000	4,000	4,000	4,000	4,000	3,700	4,000
Sour Gas Oil	52,700	85,900	50,100	95,200	86,400	91,300	18,700	66,300
Total	**216,400**	**224,900**	**240,960**	**224,200**	**232,900**	**237,300**	**261,600**	**248,300**
Refinery Unit Rates (b/d Except Where Noted)								
Crude Unit – Atmospheric Column	159,700	135,000	186,860	125,000	142,500	142,200	239,200	178,000
Crude Unit - Vacuum Column	117,500	89,000	119,500	81,000	88,300	84,400	135,000	106,000
NHT	6,200	14,600	17,900	17,800	21,300	22,400	24,400	19,400
Catalytic Reformers	19,500	24,800	27,000	26,900	29,200	29,800	30,000	27,900
Pen/Hex Isomerization Unit	5,500	9,500	11,000	11,000	12,600	13,100	13,900	11,700
JHT	21,600	27,900	30,500	25,400	29,000	33,200	46,000	38,400
DHT	24,200	17,200	26,800	14,300	17,200	16,600	38,900	25,700
FCC FHT	80,000	80,000	80,000	80,000	80,000	80,000	74,400	80,000
FCC	80,000	80,000	80,000	80,000	80,000	80,000	74,400	80,000
GHT	19,500	19,500	19,500	19,500	19,500	19,500	18,200	19,500
Alkylation Unit	27,700	27,700	27,700	27,700	27,700	27,700	25,800	27,700
Polymerization Unit	7,600	7,600	7,600	7,600	7,600	7,600	7,100	7,600

	Case #							
	1	2	3	4	5	6	7	8
Hydrocracker	51,300	51,300	51,300	51,300	51,300	51,300	47,700	51,300
Richmond Lube Oil Plant (RLOP)								
LNC – light neutral hydrocracker	16,500	16,500	16,500	16,500	16,500	16,500	15,300	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000	22,000	22,000	22,000	20,500	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000	26,000	26,000	26,000	24,200	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000	12,000	12,000	12,000	11,200	12,000
Solvent De-Asphalting (SDA) Unit	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Sulfur Recovery Unit (SRU) (lt/day)	**304**	**799**	**320**	**793**	**839**	**668**	**246**	**285**
Hydrogen Plant production (mmscfd)	**193**	**221**	**189**	**219**	**222**	**209**	**174**	**186**
Crude Oil Blend (barrels per day)								
Alaskan North Slope			60,460					
Arab Extra Light								
Arab Light								
Arab Medium								
Basrah								
Kern River	159,700		126,400				138,700	
Bakken								
Peace River Heavy					142,500			
Eocene		135,000						
Cupiagua								

	Case #							
	1	2	3	4	5	6	7	8
Murban								
Bonny Light							100,500	
Northwest Shelf Condensate								
Kuito								178,000
Maya						142,200		
Peace Light								
Gulf of Suez								
Seal Heavy				125,000				
Oriente								

	Case #							
	9	10	11	12	13	14	15	16
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	100%	100%[1]	100%[1]	100%	100%	100%	100%[1]
Crude Oil Fractions (% Each Boiling Point Range From Assay Data)								
Butane and Lighter Fractions	0.4	1.4	1.0	1.0	1.1	1.1	1.3	2.2
Naphtha (55-290)	8.6	10.4	11.9	11.9	13.4	13.4	14.4	16.8
Kerosene (290-510)	15.9	17.1	17.1	17.1	18.6	18.6	20.3	19.9
Diesel (510-625)	14.7	10.7	11.6	11.6	11.5	11.5	11.4	10.1
Gas Oil (625-770)	18.1	12.3	15.2	15.2	14.7	14.7	13.5	12.0
Heavy Oil (770-1020)	22.9	19.8	22.3	22.3	21.2	21.2	19.7	18.1
Residuum (1020+)	19.4	28.3	20.9	20.9	19.4	19.4	19.4	20.9
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)								
Crude Oil API Gravity (degrees)	22.7	24.0	26.3	26.3	28.2	28.2	29.6	30
Crude Oil Specific Gravity	0.918	0.910	0.876	0.876	0.886	0.886	0.878	0.876
Crude Oil Sulfur Content	0.65	1.59	1.59	1.59	1.67	1.67	1.55	2.98
Sour Gas Oil Sulfur Content	2.25	1.50	2.00	8.50	8.04	1.50	1.50	2.00
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	46	60	45	45	45	50	50	55
Crude and Purchased Gas Oil Use (b/d)								
Crude Oil	257,200	176,500	239,200	239,200	257,200	257,200	257,200	239,200
Sweet Gas Oil	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Sour Gas Oil	25,500	74,100	41,000	41,000	38,300	38,300	45,500	58,800

	Case #							
	9	10	11	12	13	14	15	16
Total	**286,700**	**254,600**	**284,200**	**284,200**	**299,500**	**299,500**	**306,700**	**302,000**
Refinery Unit Rates (b/d Except Where Noted)								
Crude Unit – Atmospheric Column	257,200	176,500	239,200	239,200	257,200	257,200	257,200	239,200
Crude Unit - Vacuum Column	139,000	99,100	127,100	127,100	129,200	129,200	123,100	111,900
NHT	28,800	24,300	35,100	35,100	41,600	41,600	44,500	47,400
Catalytic Reformers	33,900	31,100	37,900	37,900	42,100	42,100	44,000	45,800
Pen/Hex Isomerization Unit	16,100	14,000	19,100	19,100	22,100	22,100	23,500	24,800
JHT	52,600	41,000	52,200	52,200	59,100	59,100	63,500	58,600
DHT	42,500	23,600	32,400	32,400	34,300	34,300	34,100	29,000
FCC FHT	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
FCC	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
GHT	19,500	19,500	19,500	19,500	19,500	19,500	19,500	19,500
Alkylation Unit	27,700	27,700	27,700	27,700	27,700	27,700	27,700	27,700
Polymerization Unit	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600
Hydrocracker	51,300	51,300	51,300	51,300	51,300	51,300	51,300	51,300
Richmond Lube Oil Plant (RLOP)								
LNC – light neutral hydrocracker	16,500	16,500	16,500	16,500	16,500	16,500	16,500	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000

	Case #							
	9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Solvent De-Asphalting (SDA) Unit	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Sulfur Recovery Unit (SRU)(lt/day)	**267**	**439**	**521**	**900**	**900**	**529**	**509**	**876**
Hydrogen Plant production (mmscfd)	**186**	**194**	**199**	**226**	**223**	**197**	**194**	**218**
Crude Oil Blend (b/d)								
Alaskan North Slope								
Arab Extra Light								
Arab Light			158,500	158,500	194,500	194,500	178,300	
Arab Medium								
Basrah								228,200
Kern River	134,000		80,700	80,700	62,700	62,700		
Bakken								
Peace River Heavy								
Eocene								11,000
Cupiagua								
Murban								
Bonny Light	123,200							
Northwest Shelf Condensate								
Kuito							78,900	
Maya								
Peace Light								

	Case #							
	9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Gulf of Suez								
Seal Heavy								
Oriente		176,500						

	Case #							
	17	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%[1]	100%	100%[1]	100%	93%	93%	100%	100%
Crude Oil Fractions (% Each Boiling Point Range From Assay Data)								
Butane and Lighter Fractions	2.2	1.5	2.2	1.4	2.2	2.2	1.4	1.5
Naphtha (55-290)	16.8	15.3	17.3	16.2	17.3	17.3	16.4	16.3
Kerosene (290-510)	19.9	20.8	20.2	20.5	20.2	20.2	21.1	20.8
Diesel (510-625)	10.1	11.1	10.2	10.8	10.2	10.2	10.7	10.7
Gas Oil (625-770)	12.0	13.1	12.0	13.1	12.0	12.0	12.7	12.9
Heavy Oil (770-1020)	18.1	18.8	17.9	18.5	17.9	17.9	18.2	18.3
Residuum (1020+)	20.9	19.4	20.1	19.4	20.1	20.1	19.4	19.4
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)								
Crude Oil API Gravity (degrees)	30	30.3	30.6	30.6	30.6	30.6	30.8	31.1
Crude Oil Specific Gravity	0.876	0.874	0.873	0.873	0.873	0.873	0.872	0.870
Crude Oil Sulfur Content	2.98	1.8	2.90	2.48	2.90	2.90	2.21	2.36
Sour Gas Oil Sulfur Content	2.29	1.50	1.50	1.50	2.25	3.42	1.50	1.50
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	55	50	55	50	60	60	50	50
Crude and Purchased Gas Oil Use (b/d)								
Crude Oil	239,200	257,200	248,500	257,200	239,200	239,200	257,200	257,200
Sweet Gas Oil	4,000	4,000	4,000	4,000	3,700	3,700	4,000	4,000
Sour Gas Oil	58,800	48,800	56,300	49,400	48,600	48,600	51,100	50,400

	Case #							
	17	18	19	20	21	22	23	24
Total	**302,000**	**310,000**	**308,800**	**310,600**	**291,500**	**291,500**	**312,300**	**311,600**
Refinery Unit Rates (b/d Except Where Noted)								
Crude Unit – Atmospheric Column	239,200	257,200	248,500	257,200	239,200	239,200	257,200	257,200
Crude Unit - Vacuum Column	111,900	120,200	114,000	119,600	109,700	109,700	118,200	118,700
NHT	47,400	46,900	50,300	49,200	48,300	48,300	49,600	49,400
Catalytic Reformers	45,800	45,500	47,700	47,000	45,300	45,300	47,200	47,100
Pen/Hex Isomerization Unit	24,800	24,600	26,200	25,700	25,100	25,100	25,900	25,800
JHT	58,600	64,800	61,400	64,100	58,600	58,600	65,600	64,700
DHT	29,000	33,300	30,000	32,400	28,900	28,900	32,200	32,200
FCC FHT	80,000	80,000	80,000	80,000	74,400	74,400	80,000	80,000
FCC	80,000	80,000	80,000	80,000	74,400	74,400	80,000	80,000
GHT	19,500	19,500	19,500	19,500	18,200	18,200	19,500	19,500
Alkylation Unit	27,700	27,700	27,700	27,700	25,800	25,800	27,700	27,700
Polymerization Unit	7,600	7,600	7,600	7,600	7,100	7,100	7,600	7,600
Hydrocracker	51,300	51,300	51,300	51,300	47,700	47,700	51,300	51,300
Richmond Lube Oil Plant (RLOP)								
LNC – light neutral hydrocracker	16,500	16,500	16,500	16,500	15,300	15,300	16,500	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000	22,000	20,500	20,500	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000	26,000	24,200	24,200	26,000	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000	12,000	11,200	11,200	12,000	12,000

	Case #							
	17	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Solvent De-Asphalting (SDA) Unit	50,000	50,000	50,000	50,000	48,200	48,200	50,000	50,000
Sulfur Recovery Unit (SRU)(lt/day)	900	580	834	759	819	900	691	728
Hydrogen Plant production (mmscfd)	220	198	214	210	202	208	205	208
Crude Oil Blend (b/d)								
Alaskan North Slope								
Arab Extra Light								
Arab Light		179,900		206,500			206,800	216,800
Arab Medium								
Basrah	228,200		248,500		239,200	239,200		
Kern River								
Bakken								
Peace River Heavy				50,700				
Eocene	11,000							
Cupiagua								
Murban								
Bonny Light								
Northwest Shelf Condensate								
Kuito								
Maya							50,400	
Peace Light								

	Case #							
	17	18	19	20	21	22	23	24
Gulf of Suez								
Seal Heavy								40,400
Oriente		77,300						

	Case #							
	25	26	27	28	29	30	31	32
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	93%[2]	100%[1]	100%	93%	100%	100%	100%[1]
Crude Oil Fractions (% Each Boiling Point Range From Assay Data)								
Butane and Lighter Fractions	1.8	1.6	1.6	2.2	2.2	1.2	1.7	1.3
Naphtha (55-290)	15.5	17.4	17.4	19.3	19.3	19.1	19.4	20.7
Kerosene (290-510)	20.3	22.2	22.2	22.1	22.1	25.9	22.8	25.8
Diesel (510-625)	11.1	11.1	11.1	11.2	11.2	16.8	11.5	16.3
Gas Oil (625-770)	12.8	13.3	13.3	13.0	13.0	16.5	13.2	16.0
Heavy Oil (770-1020)	19.1	18.3	18.3	17.3	17.3	14.3	17.7	13.8
Residuum (1020+)	19.3	16.1	16.1	15.0	15.0	6.2	13.7	6.0
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)								
Crude Oil API Gravity (degrees)	31.3	32.9	32.9	33.7	33.7	34.1	34.7	34.9
Crude Oil Specific Gravity	0.869	0.861	0.861	0.857	0.857	0.854	0.851	0.850
Crude Oil Sulfur Content	1.41	2.00	2.00	1.58	1.58	0.15	1.62	0.15
Sour Gas Oil Sulfur Content	1.50	2.00	4.43	2.25	2.25	2.25	1.50	2.00
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	50	45	45	50	50	25	50	25
Crude and Purchased Gas Oil Use (b/d)								
Crude Oil	257,200	239,200	239,200	257,200	239,200	257,200	257,200	239,200
Sweet Gas Oil	4,000	4,000	4,000	4,000	3,700	4,000	4,000	4,000
Sour Gas Oil	48,900	63,500	63,500	61,200	56,700	76,000	61,900	85,100

	Case #							
	25	26	27	28	29	30	31	32
TOTAL	310,100	306,700	306,700	322,400	299,596	337,200	323,100	328,300
Refinery Unit Rates (b/d Except Where Noted)								
Crude Unit – Atmospheric Column	257,200	239,200	239,200	257,200	239,196	257,200	257,200	239,200
Crude Unit - Vacuum Column	120,200	102,900	102,900	104,600	97,300	80,400	102,500	72,300
NHT	47,300	49,100	49,100	57,300	53,300	57,600	57,600	57,600
Catalytic Reformers	45,800	46,900	46,900	52,200	48,500	52,400	52,400	52,400
Pen/Hex Isomerization Unit	24,800	25,700	25,700	29,500	27,400	29,600	29,600	29,600
JHT	63,500	64,300	64,300	68,200	63,300	78,300	70,000	73,300
DHT	33,300	31,400	31,400	33,400	31,200	47,900	34,300	43,800
FCC FHT	80,000	80,000	80,000	80,000	74,400	80,000	80,000	80,000
FCC	80,000	80,000	80,000	80,000	74,400	80,000	80,000	80,000
GHT	19,500	19,500	19,500	19,500	18,200	19,500	19,500	19,500
Alkylation Unit	27,700	27,700	27,700	27,700	25,800	27,700	27,700	27,700
Polymerization Unit	7,600	7,600	7,600	7,600	7,100	7,600	7,600	7,600
Hydrocracker	51,300	51,300	51,300	51,300	47,700	51,300	51,300	51,300
Richmond Lube Oil Plant (RLOP)								
LNC – light neutral hydrocracker	16,500	16,500	16,500	16,500	15,300	16,500	16,500	16,500
LNF – light neutral hydrofinisher	22,000	22,000	22,000	22,000	20,500	22,000	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	26,000	26,000	26,000	24,200	26,000	26,000	26,000
HNF – heavy neutral hydrofinisher	12,000	12,000	12,000	12,000	11,200	12,000	12,000	12,000

	Case #							
	25	**26**	**27**	**28**	**29**	**30**	**31**	**32**
Solvent De-Asphalting (SDA) Unit	49,600	38,400	38,400	38,600	35,900	16,000	35,200	14,400
Sulfur Recovery Unit (SRU) (lt/day)	**475**	**680**	**900**	**605**	**562**	**290**	**549**	**285**
Hydrogen Plant production (mmscfd)	**190**	**202**	**217**	**193**	**179**	**176**	**188**	**165**
Crude Oil Blend (b/d)								
Alaskan North Slope				68,233	63,457			
Arab Extra Light				62,985	58,576			
Arab Light		214,830	214,830	83,988	78,109		215,000	
Arab Medium				7,877	7,326			
Basrah		24,370	24,370	28,869	26,848			
Kern River								
Bakken								
Peace River Heavy								
Eocene								
Cupiagua							42,200	
Murban				5,248	4,880			
Bonny Light						244,820		219,700
Northwest Shelf Condensate						12,380		19,500
Kuito								
Maya								
Peace Light								

	Case #							
	25	26	27	28	29	30	31	32
Gulf of Suez	257,200							
Seal Heavy								
Oriente								

	Case #						
	33	34	35	36	37[1]	38	39
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	100%	93%	93%	100%	100%	100%	100%
Crude Oil Fractions (% Each Boiling Point Range From Assay Data)							
Butane and Lighter Fractions	1.4	1.3	1.8	2.5	3.0	N/A	N/A
Naphtha (55-290)	19.1	20.8	20.8	18.7	29.2	N/A	N/A
Kerosene (290-510)	26.2	25.8	26.3	25.0	24.8	N/A	N/A
Diesel (510-625)	15.8	16.3	14.7	11.7	12.6	N/A	N/A
Gas Oil (625-770)	15.8	16.0	14.7	12.9	12.2	N/A	N/A
Heavy Oil (770-1020)	15.1	13.8	15.1	16.1	14.4	N/A	N/A
Residuum (1020+)	6.6	6.0	6.7	13.2	3.9	N/A	N/A
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)							
Crude Oil API Gravity (degrees)	35.0	35.1	36.6	39.9	43.1	N/A	N/A
Crude Oil Specific Gravity	0.850	0.849	0.842	0.826	0.810	N/A	N/A
Crude Oil Sulfur Content	0.17	0.15	0.18	0.43	0.08	N/A	N/A
Sour Gas Oil Sulfur Content	2.25	2.25	2.25	1.50	1.50	2.25	3.79
Sweet Gas Oil Sulfur Content	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA	20	25	20	20	30		
Crude and Purchased Gas Oil Use (b/d)							
Crude Oil	257,200	239,200	239,200	257,200	174,300	N/A	N/A
Sweet Gas Oil	4,000	3,700	3,700	4,000	4,000	4,000	4,000

	Case #						
	33	34	35	36	37[1]	38	39
Sour Gas Oil	75,200	73,300	72,100	67,800	115,500	166,800	166,800
Total	**336,400**	**316,200**	**315,000**	**329,000**	**293,800**	**170,800**	**170,800**
Refinery Unit Rates (b/d Except Where Noted)							
Crude Unit – Atmospheric Column	257,200	239,200	239,200	257,200	174,300	N/A	N/A
Crude Unit - Vacuum Column	82,100	72,200	74,900	96,900	45,700	N/A	N/A
NHT	57,600	57,600	57,600	56,200	57,600	4,000	4,000
Catalytic Reformers	52,400	51,300	51,200	51,500	52,400	18,000	18,000
Pen/Hex Isomerization Unit	29,600	29,400	29,400	29,000	29,600	4,500	4,500
JHT	79,000	72,500	73,500	75,600	54,300	11,900	11,900
DHT	45,500	43,600	39,600	34,800	26,700	3,000	3,000
FCC FHT	80,000	74,400	74,400	80,000	80,000	80,000	80,000
FCC	80,000	74,400	74,400	80,000	80,000	80,000	80,000
GHT	19,500	18,200	18,200	19,500	19,500	19,500	19,500
Alkylation Unit	27,700	25,800	25,800	27,700	27,700	27,700	27,700
Polymerization Unit	7,600	7,100	7,100	7,600	7,600	7,600	7,600
Hydrocracker	51,300	47,700	47,700	51,300	51,300	51,300	51,300
Richmond Lube Oil Plant (RLOP)							
LNC – light neutral hydrocracker	16,500	15,300	15,300	16,500	16,500	16,500	16,500
LNF – light neutral hydrofinisher	22,000	20,500	20,500	22,000	22,000	22,000	22,000
HNC – heavy neutral hydrocracker	26,000	24,200	24,200	26,000	26,000	26,000	26,000

	Case #						
	33	**34**	**35**	**36**	**37**[1]	**38**	**39**
HNF – heavy neutral hydrofinisher	12,000	11,200	11,200	12,000	12,000	12,000	12,000
Solvent De-Asphalting (SDA) Unit	17,000	14,400	15,900	33,900	6,700	14,400	14,400
Sulfur Recovery Unit (SRU) (lt/day)	**294**	**277**	**283**	**274**	**263**	**535**	**900**
Hydrogen Plant production (mmscfd)	168	154	154	168	157	192	218
Crude Oil Blend (b/d)							
Alaskan North Slope						N/A	N/A
Arab Extra Light						N/A	N/A
Arab Light						N/A	N/A
Arab Medium						N/A	N/A
Basrah						N/A	N/A
Kern River						N/A	N/A
Bakken	69,500		112,500			N/A	N/A
Peace River Heavy						N/A	N/A
Eocene						N/A	N/A
Cupiagua					174,300	N/A	N/A
Murban						N/A	N/A
Bonny Light	187,700	219,200	126,700			N/A	N/A
Northwest Shelf Condensate		20,000				N/A	N/A
Kuito						N/A	N/A
Maya						N/A	N/A

	Case #						
	33	34	35	36	37[1]	38	39
Peace Light				257,200		N/A	N/A
Gulf of Suez						N/A	N/A
Seal Heavy						N/A	N/A
Oriente						N/A	N/A

	Case #	
	40	41
Crude and Gas Oil Gateway Unit Capacity Utilization (%)	93%	93%
Crude Oil Fractions (% Each Boiling Point Range From Assay Data)		
Butane and Lighter Fractions	N/A	N/A
Naphtha (55-290)	N/A	N/A
Kerosene (290-510)	N/A	N/A
Diesel (510-625)	N/A	N/A
Gas Oil (625-770)	N/A	N/A
Heavy Oil (770-1020)	N/A	N/A
Residuum (1020+)	N/A	N/A
Feedstock Input Characteristics (% Weight, Unless Otherwise Specified)		
Crude Oil API Gravity (degrees)	N/A	N/A
Crude Oil Specific Gravity	N/A	N/A
Crude Oil Sulfur Content	N/A	N/A
Sour Gas Oil Sulfur Content	2.25	3.79
Sweet Gas Oil Sulfur Content	0.25	0.25
Crude Oil Sulfur in Residuum Fraction Processed in SDA		
Crude and Purchased Gas Oil Use (b/d)		
Crude Oil	N/A	N/A
Sweet Gas Oil	3,700	3,700
Sour Gas Oil	154,900	154,900

	Case #	
	40	**41**
TOTAL	158,600	158,600
Refinery Unit Rates (b/d Except Where Noted)		
Crude Unit – Atmospheric Column	N/A	N/A
Crude Unit - Vacuum Column	N/A	N/A
NHT	3,700	3,700
Catalytic Reformers	16,800	16,800
Pen/Hex Isomerization Unit	4,200	4,200
JHT	11,100	11,100
DHT	2,800	2,800
FCC FHT	74,400	74,400
FCC	74,400	74,400
GHT	18,200	18,200
Alkylation Unit	25,800	25,800
Polymerization Unit	7,100	7,100
Hydrocracker	47,700	47,700
Richmond Lube Oil Plant (RLOP)		
LNC – light neutral hydrocracker	15,300	15,300
LNF – light neutral hydrofinisher	20,500	20,500
HNC – heavy neutral hydrocracker	24,200	24,200
HNF – heavy neutral hydrofinisher	11,200	11,200

	Case #	
	40	**41**
Solvent De-Asphalting (SDA) Unit	N/A	N/A
Sulfur Recovery Unit (SRU) (lt/day)	497	836
Hydrogen Plant production (mmscfd)	179	203
Crude Oil Blend (b/d)		
Alaskan North Slope	N/A	N/A
Arab Extra Light	N/A	N/A
Arab Light	N/A	N/A
Arab Medium	N/A	N/A
Basrah	N/A	N/A
Kern River	N/A	N/A
Bakken	N/A	N/A
Peace River Heavy	N/A	N/A
Eocene	N/A	N/A
Cupiagua	N/A	N/A
Murban	N/A	N/A
Bonny Light	N/A	N/A
Northwest Shelf Condensate	N/A	N/A
Kuito	N/A	N/A
Maya	N/A	N/A
Peace Light	N/A	N/A

	Case #	
	40	41
Gulf of Suez	N/A	N/A
Seal Heavy	N/A	N/A
Oriente	N/A	N/A

Notes:

1. Case in which gas oil gateway units operate at 100% capacity, but 100% crude unit capacity cannot be achieved due to exceedance of at least one processing unit throughput limit.
2. Case in which crude unit is limited to specified level.

Chevron

T.A. Lizarraga
Manager

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June 11, 2009

Richard Mitchell
Director, Planning and Building Services
City of Richmond
450 Civic Center Plaza
Richmond, CA 94804

Chevron Richmond Refinery
Conditional Use Permit Condition D2

Dear Mr. Mitchell:

This letter provides test reports for the First Quarter 2009 6-Element Sampling at Chevron's Richmond Refinery. This information is being submitted pursuant to Condition D2 of Chevron's Conditional Use Permit, Number 1101974, for the Chevron Energy and Hydrogen Renewal Project.

Attachment 1 to this letter summarizes the results for each sample analysis required by the condition. The final results for the First Quarter 2009 samples were received by Chevron from the analytical laboratory on May 15, 2009.

Sampling was performed according to the protocol submitted to the City and BAAQMD in December, 2008. As explained in that protocol, Chevron would make subsequent improvements for sampling gas streams that should be more accurate than the "grab samples" specified in the condition and used for the Fourth Quarter 2008 samples. The following changes were implemented to improve the analytical and gas sampling monitoring:

- The analytical laboratory for the crude oil and gas oil samples was switched to Frontier GeoSciences, a leading analytical lab for mercury and other metals in petroleum hydrocarbons.
- The gas volume collected for each gas stream was increased from 6 liters to 18 liters.

The flow-through gas sampling stations are under construction. Future gas sampling volumes will be increased to 120 liters, as noted in the protocol, once the gas sampling stations are completed and tested.

If you have any questions concerning this report, please contact Ms. Karen Graul at (510) 242-4930.

Sincerely,

Tery Lizarraga

Attachment

cc: Lamont Thompson (City of Richmond)

bcc: Robert Chamberlin
Lisa Duncan
ETC Project Group c/o Ross Smart

ATTACHMENT 1 (3 pages)

Chevron Richmond Refinery
Conditional Use Permit Condition D2
Report for Quarter Ending: 3/31/2009

Liquid Samples - Metals

Compound: Cadmium Test Method: ICP-MS (EPA 1638) Date: 4/26/09

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit 3/5/09	ND	0.002	0.010		ND	0.002	0.010		ND	0.002	0.009	
Gas Oil - FCC - 3/16/09	0.002	0.002	0.009	J	ND	0.002	0.010		0.002	0.002	0.010	J
Gas Oil - TKN - 2/12/09	ND	0.002	0.010		ND	0.002	0.010		ND	0.002	0.010	
Gas Oil - TKC - 1/27/09	ND	0.002	0.010		0.007	0.002	0.008	J	ND	0.002	0.011	

Compound: Nickel Test Method: ICP-MS (EPA 1638) Date: 4/26/09

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit 3/5/09	6.06	0.009	0.04		6.07	0.009	0.04		6.02	0.009	0.04	
Gas Oil - FCC - 3/16/09	1.15	0.009	0.04		1.14	0.009	0.04		1.12	0.009	0.04	
Gas Oil - TKN - 2/12/09	0.06	0.009	0.04		0.07	0.009	0.04		0.06	0.009	0.04	
Gas Oil - TKC - 1/27/09	0.42	0.009	0.04		0.45	0.008	0.03		0.45	0.010	0.04	

Compound: Selenium Test Method: ICP-MS (EPA 1638) Date: 5/ /09

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit 3/5/09	0.284	0.0078	0.039		0.273	0.008	0.04		0.279	0.0076	0.038	
Gas Oil - FCC - 3/16/09	0.053	0.0078	0.037		0.062	0.0074	0.038		0.06	0.0080	0.040	
Gas Oil - TKN - 2/12/09	0.057	0.0080	0.040		0.062	0.008	0.040		0.043	0.0078	0.039	
Gas Oil - TKC - 1/27/09	0.071	0.0078	0.039		0.065	0.0068	0.034		0.076	0.0086	0.043	

Compound: Vanadium Test Method: ICP-MS (EPA 1638) Date: 4/26/09

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit 3/5/09	15.7	0.100	0.100		15.8	0.100	0.100		15.4	0.09	0.09	
Gas Oil - FCC - 3/16/09	1.3	0.09	0.09		1.33	0.100	0.10		1.19	0.100	0.10	
Gas Oil - TKN - 2/12/09	0.13	0.100	0.10		0.13	0.100	0.10		0.12	0.100	0.10	
Gas Oil - TKC - 1/27/09	0.79	0.10	0.10		0.84	0.08	0.08		0.88	0.11	0.11	

Compound: Mercury Test Meth EPA 1631 (Cold Vapor Atomic Fluorescence Spectrometry)

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit 3/5/09	ND	0.00088	0.00242		0.00095	0.00091	0.00252	J	ND	0.00085	0.00235	
Gas Oil - FCC - 3/16/09	0.00125	0.00084	0.00233	J	0.00180	0.00087	0.00240	J	0.00133	0.00091	0.00251	J
Gas Oil - TKN - 2/12/09	ND	0.00091	0.00499		ND	0.00091	0.00481		ND	0.00088	0.00472	
Gas Oil - TKC - 1/26/09*	ND	0.00090	0.00249		ND	0.00086	0.00238		ND	0.00085	0.00235	

*TKC-1/26/09 - ship sample not collected for Hg. Used TKC feed tank sample.

Gas Samples - Metals

Compound	Mercury Date:3/31/09														
	Replicate 1					Replicate 2					Replicate 3				
Source	Result ug	RL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	DNQ	0.03		0.0201	DNQ	DNQ	0.03		0.0218	DNQ	DNQ	0.03		0.0211	DNQ
Fuel Gas - V701	DNQ	0.03		0.0191	DNQ	DNQ	0.03		0.0207	DNQ	DNQ	0.03		0.0212	DNQ
Fuel Gas - V870	0.0386	0.03		0.0211	1.83	0.0055	0.03	J	0.0222	0.248	0.0070	0.03	J	0.0214	0.327
Flare Gas - V731	0.0152	0.03	J	0.0135	1.124	DNQ	0.03		0.0149	DNQ	DNQ	0.03		0.0165	DNQ
Flare Gas - F3901	DNQ	0.03		0.0148	DNQ	DNQ	0.03		0.0149	DNQ	DNQ	0.03		0.0145	DNQ

Compound	Cadmium Date:3/31/09														
	Replicate 1					Replicate 2					Replicate 3				
Source	Result ug	RL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	ND	0.15		0.0201	ND	ND	0.15		0.0218	ND	ND	0.15		0.0211	ND
Fuel Gas - V701	ND	0.15		0.0191	ND	ND	0.15		0.0207	ND	ND	0.15		0.0212	ND
Fuel Gas - V870	ND	0.15		0.0211	ND	ND	0.15		0.0222	ND	ND	0.15		0.0214	ND
Flare Gas - V731	ND	0.15		0.0135	ND	ND	0.15		0.0148	ND	ND	0.15		0.0165	ND
Flare Gas - F3901	ND	0.15		0.0148	ND	ND	0.15		0.0149	ND	ND	0.15		0.0145	ND

Compound	Nickel Date:3/31/09														
	Replicate 1					Replicate 2					Replicate 3				
Source	Result ug	RL ug	Flag	Vol Gas dscm*	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm
Fuel Gas - V475-B	0.010	0.3	J	0.0201	0.497	0.001	0.3	J	0.0218	0.046	0.226	0.3	J	0.0211	10.71
Fuel Gas - V701	DNQ	0.3		0.0191	DNQ	DNQ	0.3		0.0207	DNQ	DNQ	0.3		0.0212	DNQ
Fuel Gas - V870	DNQ	0.3		0.0211	DNQ	DNQ	0.3		0.0222	DNQ	0.002	0.3	J	0.0214	0.093
Flare Gas - V731	DNQ	0.3		0.0135	DNQ	DNQ	0.3		0.0148	DNQ	DNQ	0.3		0.0165	DNQ
Flare Gas - F3901	0.025	0.3	J	0.0148	1.687	DNQ	0.3		0.0149	DNQ	DNQ	0.3		0.0145	DNQ

Compound	Selenium Date:3/31/09														
	Replicate 1					Replicate 2					Replicate 3				
Source	Result ug	RL ug	Flag	Vol Gas dscm*	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm
Fuel Gas - V475-B	0.26	0.3	J	0.0201	12.933	ND	0.3		0.0218	ND	ND	0.3		0.0211	ND
Fuel Gas - V701	ND	0.3		0.0191	ND	ND	0.3		0.0207	ND	ND	0.3		0.0212	ND
Fuel Gas - V870	ND	0.3		0.0211	ND	ND	0.3		0.0222	ND	ND	0.3		0.0214	ND
Flare Gas - V731	ND	0.3		0.0135	ND	ND	0.3		0.0148	ND	ND	0.3		0.0165	ND
Flare Gas - F3901	ND	0.3		0.0148	ND	ND	0.3		0.0149	ND	ND	0.3		0.0145	ND

Compound	Vanadium Date:3/31/09														
	Replicate 1					Replicate 2					Replicate 3				
Source	Result ug	RL ug	Flag	Vol Gas dscm*	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm	Result ug	RL ug	Flag	Vol Gas dscm	Conc. ug/dscm
Fuel Gas - V475-B	ND	1.5		0.0201	ND	ND	1.5		0.0218	ND	ND	0.47		0.0211	ND
Fuel Gas - V701	ND	1.5		0.0191	ND	ND	1.5		0.0207	ND	ND	0.47		0.0212	ND
Fuel Gas - V870	ND	1.5		0.0211	ND	ND	1.5		0.0222	ND	ND	0.47		0.0214	ND
Flare Gas - V731	ND	1.5		0.0135	ND	ND	1.5		0.0148	ND	ND	0.47		0.0165	ND
Flare Gas - F3901	ND	1.5		0.0148	ND	ND	1.5		0.0149	ND	ND	0.47		0.0145	ND

ATTACHMENT 1 (3 pages)

Chevron Richmond Refinery
Conditional Use Permit Condition D2
Report for Quarter Ending: 3/31/2009

Liquid HC and Gas Samples - Total Sulfur

Compound:	Sulfur	
Source	Total Sulfur	
	wt %	mol ppm*
Liquid HC Samples - 3/27/09		
Crude Oil - Crude Unit 3/5/09	1.13	
Gas Oil - FCC - 3/16/09	0.232	
Gas Oil - TKN - 2/12/09	1.66	
Gas Oil - TKC - 1/27/09	2.24	
Gas Samples - 3/25/09		
V475-B - 3/24/09		40.4
V701 - 3/24/09		28.9
V870 - 3/24/09		38.5
V731 (NY Flare) - 3/25/09		66.6
F3901 (SY Flare) - 3/25/09		172.9

Key:

RL: Reporting Limit
MDL: Method Detection Limit
J Flag: Estimated value. Analyte detected at a level less than the Reporting Limit, but greater than or equal to the Method Detection Limit
DNQ: Detected but Not Quantified. All gas samples were blank corrected and where blank value exceeded the measured value, DNQ was denoted.
ND: Not detected
dsl: dry standard liter
dscm: dry standard cubic meter at 29.92 " Hg, 68 Deg. F (760 mm Hg 20 Deg C)
Conc: Concentration
* Limit of detection for analysis was 0.1 mol ppm. Convert to wt/wt ppm S by multiplying by factor of 2.

Chevron

December 17, 2009

Richard Mitchell
Director, Planning and Building Services
City of Richmond
1401 Marina Way South
Richmond, CA 94804

Chevron Richmond Refinery
Conditional Use Permit Condition D2

Dear Mr. Mitchell:

This letter provides the test report for Six Element Sampling at Chevron's Richmond Refinery for the Second Quarter of 2009. This information is submitted pursuant to Condition D2 of Chevron's Conditional Use Permit, Number 1101974, for the Chevron Energy and Hydrogen Renewal Project.

Sampling was performed according to the protocol submitted to the City and BAAQMD in December 2008. The final set of analytical results for Second Quarter 2009 samples were received by Chevron from the analytical laboratories on November 25, 2009.

Please find attached *Six Element Sampling Results Report for Quarter Ending June 30, 2009* which summarizes the results for each sample analysis required by the D2 condition.

If you have any questions concerning this report, please contact Ms. Winnie Lieu at (510) 242-2742.

Sincerely,

Karen Grant

for Tery Lizarraga

Attachment:
Six Element Sampling Results Report for Quarter Ending June 30, 2009

December 17, 2009

Richard Mitchell
Director, Planning and Building Services
City of Richmond
1401 Marina Way South
Richmond, CA 94804

Chevron Richmond Refinery
Conditional Use Permit Condition D2

This letter provides the test report for Six Element Sampling at Chevron's Richmond Refinery for the Second Quarter of 2009. This information is submitted pursuant to Condition D2 of Chevron's Conditional Use Permit, Number 1101974, for the Chevron Energy and Hydrogen Renewal Project.

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Please find attached *Six Element Sampling Results Report for Quarter Ending June 30, 2009* which summarizes the results for each sample analysis required by the D2 condition.

If you have any questions concerning this report, please contact Ms. Winnie Lieu at (510) 242-2742.

Sincerely,

Original Signed By
Karen Graul

KMG
Tery Lizarraga

Attachment:
Six Element Sampling Results Report for Quarter Ending June 30, 2009

Bcc:
Robert Chamberlain, Richmond Renewal Project
Rolf Lindenhayn, Richmond Renewal Project
ETC (c/o Matt Diaz)

Chevron Richmond Refinery
Conditional Use Permit Condition D2
Six Element Sampling Results Report for Quarter Ending: 6/30/2009

Liquid Samples - Metals

Compound:	Cadmium				Test Method: ICP-MS (EPA 1638)				Date: 5/20/09			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit 5/14/09	ND	0.002	0.015		ND	0.002	0.014		ND	0.002	0.015	
Gas Oil - FCC - 5/20/09	ND	0.002	0.015		ND	0.002	0.015		ND	0.002	0.014	
Gas Oil - TKN - 5/20/09	ND	0.002	0.015		ND	0.002	0.014		ND	0.002	0.014	
Gas Oil - TKC - 5/20/09	ND	0.002	0.015		ND	0.002	0.014		ND	0.002	0.015	

Compound:	Nickel				Test Method: ICP-MS (EPA 1638)				Date: 5/20/09			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit 5/14/09	4.870	0.011	0.05		4.600	0.011	0.049		5.08	0.011	0.049	
Gas Oil - FCC - 5/20/09	0.144	0.011	0.049		0.146	0.011	0.05		0.140	0.011	0.05	
Gas Oil - TKN - 5/20/09	0.061	0.011	0.05		0.071	0.011	0.049		0.069	0.010	0.047	
Gas Oil - TKC - 5/20/09	0.147	0.011	0.05		0.15	0.011	0.049		0.152	0.011	0.048	

Compound:	Selenium				Test Method: ICP-MS (EPA 1638)				Date: 5/20/09			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit 5/14/09	0.346	0.018	0.04		0.320	0.017	0.039		0.346	0.018	0.039	
Gas Oil - FCC - 5/20/09	0.060	0.018	0.04		0.042	0.018	0.04		ND	0.018	0.04	
Gas Oil - TKN - 5/20/09	0.214	0.0060	0.040		0.224	0.017	0.039		0.194	0.017	0.037	
Gas Oil - TKC - 5/20/09	ND	0.018	0.039		ND	0.017	0.038		ND	0.018	0.04	

Compound:	Vanadium				Test Method: ICP-MS (EPA 1638)				Date: 5/20/09			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit 5/14/09	13.5	0.022	0.075		12.6	0.021	0.073		14.4	0.022	0.074	
Gas Oil - FCC - 5/20/09	0.26	0.022	0.074		0.264	0.022	0.075		0.252	0.022	0.074	
Gas Oil - TKN - 5/20/09	0.92	0.022	0.075		0.101	0.021	0.073		0.102	0.021	0.070	
Gas Oil - TKC - 5/20/09	0.272	0.022	0.075		0.268	0.022	0.074		0.277	0.021	0.072	

Compound:	Mercury				Test Meth EPA 1631 (Cold Vapor Atomic Fluorescence Spectrometry)							
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit 5/14/09	ND	0.00046	0.00295		ND	0.00044	0.00284		ND	0.00046	0.00295	
Gas Oil - FCC - 5/20/09	ND	0.00046	0.00295		ND	0.00046	0.00297		ND	0.00044	0.00284	
Gas Oil - TKN - 5/20/09	ND	0.00091	0.00499		ND	0.00091	0.00481		ND	0.00088	0.00472	
Gas Oil - TKC - 5/20/09	ND	0.00047	0.00304		ND	0.00043	0.00278		ND	0.00045	0.00289	

Gas Samples - Metals

Compound: Mercury Date 6/24/09

Source	Replicate 1 Result ug	MRL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Replicate 2 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Replicate 3 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	ND	0.001		0.1483	ND	ND	0.001		0.114	ND	ND	0.001		0.111	ND
Fuel Gas - V701	ND	0.001		0.1086	ND	ND	0.001		0.1088	ND	ND	0.001		0.1099	ND
Fuel Gas - V870	0.0147	0.001		0.1144	0.1285	0.0047	0.001		0.1141	0.0413	0.0024	0.001		0.1143	0.0210
Flare Gas - K1060/1070 (N' Flare)	ND	0.001		0.1106	ND	0.0033	0.001		0.1104	0.0299	ND	0.001		0.1101	ND
Flare Gas - K3950 (SY Flare)	ND	0.001		0.1130	ND	0.0004	0.001	J	0.1133	0.0035	ND	0.001		0.1133	ND

Compound: Cadmium Date 6/24/09

Source	Replicate 1 Result ug	MRL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Replicate 2 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Replicate 3 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	ND	0.003		0.1483	ND	DNQ	0.003	J	0.1138	DNQ	ND	0.003		0.1110	ND
Fuel Gas - V701	0.0001	0.003		0.1086	0.0009	0.0022	0.003		0.1088	0.0202	ND	0.003		0.1099	ND
Fuel Gas - V870	ND	0.003		0.1144	ND	0.0072	0.003		0.1141	0.0631	ND	0.003		0.1143	ND
Flare Gas - K1060/1070 (N' Flare)	DNQ	0.003		0.1106	DNQ	0.0001	0.003	J	0.1104	0.0009	ND	0.003		0.1101	ND
Flare Gas - K3950 (SY Flare)	DNQ	0.003		0.1130	DNQ	ND	0.003		0.1133	ND	0.0022	0.003		0.1133	0.0194

Compound: Nickel Date 6/24/09

Source	Replicate 1 Result ug	MRL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Replicate 2 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Replicate 3 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	0.161	0.015		0.1483	1.0856	0.005	0.015		0.1138	0.0439	0.012	0.015		0.1110	0.1081
Fuel Gas - V701	DNQ	0.015		0.1086	DNQ	DNQ	0.015		0.1088	DNQ	DNQ	0.015		0.1099	DNQ
Fuel Gas - V870	DNQ	0.015		0.1144	DNQ	DNQ	0.015		0.1141	DNQ	DNQ	0.015		0.1143	DNQ
Flare Gas - K1060/1070 (N' Flare)	DNQ	0.015		0.1106	DNQ	0.001	0.015		0.1104	0.0091	0.003	0.015		0.1101	0.0272
Flare Gas - K3950 (SY Flare)	0.012	0.015		0.1130	0.1062	DNQ	0.015		0.1133	DNQ	0.071	0.015		0.1133	0.6267

Compound: Selenium Date 6/24/09

Source	Replicate 1 Result ug	MRL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Replicate 2 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Replicate 3 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	0.5	0.150	J	0.1483	3.3715	ND	0.150		0.1138	ND	ND	0.150		0.1110	ND
Fuel Gas - V701	ND	0.150		0.1086	ND	ND	0.150		0.1088	ND	ND	0.150		0.1099	ND
Fuel Gas - V870	ND	0.150		0.1144	ND	ND	0.150		0.1141	ND	ND	0.150		0.1143	ND
Flare Gas - K1060/1070 (N' Flare)	ND	0.150		0.1106	ND	ND	0.150		0.1104	ND	ND	0.150		0.1101	ND
Flare Gas - K3950 (SY Flare)	ND	0.150		0.1130	ND	ND	0.150		0.1133	ND	ND	0.150		0.1133	ND

Compound: Vanadium Date 6/24/09

Source	Replicate 1 Result ug	MRL ug	Flag	Vol Gas Sampled dscm*	Conc. ug/dscm	Replicate 2 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm	Replicate 3 Result ug	MRL ug	Flag	Vol Gas Sampled dscm	Conc. ug/dscm
Fuel Gas - V475-B	ND	0.075		0.1483	ND	0.012	0.075	J	0.114	0.1054	0.013	0.075	J	0.111	0.1171
Fuel Gas - V701	0.011	0.075	J	0.1086	0.1013	ND	0.075		0.1088	ND	0.011	0.075	J	0.1099	0.1001
Fuel Gas - V870	0.011	0.075	J	0.1144	0.0962	ND	0.075		0.1141	ND	ND	0.075		0.1143	ND
Flare Gas - K1060/1070 (N' Flare)	0.011	0.075	J	0.1106	0.0995	0.014	0.075	J	0.1104	0.1268	0.011	0.075	J	0.1101	0.0999
Flare Gas - K3950 (SY Flare)	0.011	0.075	J	0.1130	0.0973	ND	0.075		0.1133	ND	ND	0.075		0.1133	ND

Liquid HC and Gas Samples - Total Sulfur

Compound:	Sulfur	
Source	Total Sulfur	
	wt %	mol ppm*
Liquid HC Samples - 4/20/09		
Crude Oil - Crude Unit 5/14/09	1.13	
Gas Oil - FCC - 5/20/09	0.232	
Gas Oil - TKN - 5/20/09	1.66	
Gas Oil - TKC - 5/20/09	2.24	
Gas Samples - 6/24/09		
V475-B - 6/23/09		15.2
V701 - 6/23/09		32.6
V870 - 6/24/09		6.2
K1060/1070 (NY Flare) - 6/23/09		22,017.8
K3950 (SY Flare) - 6/24/09		483.8

Key:

RL: Reporting Limit
MDL: Method Detection Limit
J Flag: Estimated value. Analyte detected at a level less than the Reporting Limit, but greater than or equal to the Method Detection Limit.
DNQ: Detected but Not Quantified. All gas samples were blank corrected and where blank value exceeded the measured value, DNQ was denoted.
ND: Not detected
dsl: dry standard liter
dscm: dry standard cubic meter at 29.92 " Hg, 68 Deg. F (760 mm Hg 20 Deg C)
ppbvd: parts per billion by volume on a dry basis
Conc: Concentration
* Limit of detection for analysis was 0.1 mol ppm. Convert to wt/wt ppm S by multiplying by factor of 2.

January 18, 2010

Richard Mitchell
Director, Planning and Building Services
City of Richmond
1401 Marina Way South
Richmond, CA 94804

Chevron Richmond Refinery
Conditional Use Permit Condition D2

Dear Mr. Mitchell:

This letter provides the test report for Six Element Sampling at Chevron's Richmond Refinery for the Third Quarter of 2009. This information is submitted pursuant to Condition D2 of Chevron's Conditional Use Permit, Number 1101974, for the Chevron Energy and Hydrogen Renewal Project.

Sampling was performed according to the protocol submitted to the City and BAAQMD in December 2008. The final set of analytical results for Third Quarter 2009 samples were received by Chevron from the analytical laboratories on January 4, 2010.

Please find attached ***Six Element Sampling Results Report for Quarter Ending September 30, 2009*** which summarizes the results for each sample analysis required by the D2 condition.

If you have any questions concerning this report, please contact Ms. Winnie Lieu at (510) 242-2742.

Sincerely,

Original Signed By
Karen Graul

KMG
Tery Lizarraga

Attachment:
Six Element Sampling Results Report for Quarter Ending September 30, 2009

Bcc:
Robert Chamberlain, Richmond Renewal Project
Rolf Lindenhayn, Richmond Renewal Project
ETC (c/o Matt Diaz)

Chevron Richmond Refinery
Conditional Use Permit Condition D2
Report for Quarter Ending: 9/30/2009

Liquid Samples - Metals

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit	ND	0.002	0.014		ND	0.002	0.015		ND	0.002	0.014	
Gas Oil - FCC	ND	0.002	0.014		ND	0.002	0.015		ND	0.002	0.014	
Gas Oil - TKN	ND	0.002	0.014		ND	0.002	0.014		ND	0.002	0.014	
Gas Oil - TKC	ND	0.002	0.015		ND	0.002	0.015		ND	0.002	0.016	

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit	4.88	0.010	0.047		5.54	0.011	0.242		5.78	0.010	0.231	
Gas Oil - FCC	ND	0.010	0.234		0.193	0.011	0.049		0.547	0.010	0.237	
Gas Oil - TKN	ND	0.011	0.241		ND	0.010	0.233		ND	0.010	0.228	
Gas Oil - TKC	6.70	0.011	0.252		6.99	0.011	0.249		7.10	0.012	0.263	

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit	0.123	0.017	0.038		0.463	0.017	0.039		0.546	0.017	0.037	
Gas Oil - FCC	ND	0.017	0.037		0.062	0.018	0.039		0.059	0.017	0.038	
Gas Oil - TKN	0.063	0.017	0.039		0.053	0.017	0.037		0.050	0.016	0.036	
Gas Oil - TKC	0.602	0.018	0.040		0.625	0.018	0.040		0.587	0.019	0.042	

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit	12.1	0.021	0.071		14.4	0.021	0.073		14.4	0.020	0.069	
Gas Oil - FCC	0.237	0.021	0.070		0.210	0.021	0.073		0.916	0.021	0.071	
Gas Oil - TKN	0.255	0.021	0.072		0.221	0.021	0.070		0.186	0.020	0.068	
Gas Oil - TKC	16.2	0.022	0.076		16.8	0.022	0.075		16.7	0.023	0.079	

Source	Replicate 1 Result mg/kg	Replicate 1 MDL mg/kg	Replicate 1 RL mg/kg	Replicate 1 Flag	Replicate 2 Result mg/kg	Replicate 2 MDL mg/kg	Replicate 2 RL mg/kg	Replicate 2 Flag	Replicate 3 Result mg/kg	Replicate 3 MDL mg/kg	Replicate 3 RL mg/kg	Replicate 3 Flag
Crude Oil - Crude Unit	11.5	0.00046	0.00295		ND	0.00047	0.00305		ND	0.00047	0.00305	
Gas Oil - FCC	ND	0.00039	0.00250		ND	0.00041	0.00264		ND	0.00042	0.00268	
Gas Oil - TKN	ND	0.00045	0.00290		ND	0.00043	0.00280		ND	0.00042	0.00273	
Gas Oil - TKC	ND	0.00047	0.00302		ND	0.00046	0.00299		ND	0.00049	0.00316	

Gas Samples - Metals

Compound: Mercury — Dates: 9/15/09-9/16/09

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	ND	0.001		0.1118	ND	0.008	0.001		0.1113	0.0719	ND	0.001		0.1119	ND
Fuel Gas - V701	0.0012	0.001		0.1117	0.0107	ND	0.001		0.1121	ND	ND	0.001		0.1115	ND
Fuel Gas - V870	0.0564	0.001		0.1132	0.4982	0.0102	0.001		0.1131	0.0903	0.0096	0.001		0.1126	0.0855
Flare Gas - K1060/1070 (NY Flare)	ND	0.001		0.1274	ND										
Flare Gas - K3950 (SY Flare)	ND	0.001		0.1558	ND										

Compound: Cadmium — Dates: 9/15/09-9/16/09

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	0.003	0.003		0.1118	0.0268	0.007	0.003		0.1113	0.0629	ND	0.003		0.1119	ND
Fuel Gas - V701	0.0040	0.003		0.1117	0.0358	0.0030	0.003		0.1121	0.0268	ND	0.003		0.1115	ND
Fuel Gas - V870	ND	0.003		0.1132	ND	ND	0.003		0.1131	ND	ND	0.003		0.1126	ND
Flare Gas - K1060/1070 (NY Flare)	0.0030	0.003		0.1274	0.0236										
Flare Gas - K3950 (SY Flare)	ND	0.003		0.1558	ND										

Compound: Nickel — Dates: 9/15/09-9/16/09

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	0.044	0.015		0.1118	0.3937	0.157	0.015		0.1113	1.4102	0.005	0.015		0.1119	0.0447
Fuel Gas - V701	0.061	0.015		0.1117	0.5463	0.05	0.015		0.1121	0.4459	DNQ	0.015		0.1115	DNQ
Fuel Gas - V870	DNQ	0.015		0.1132	DNQ	0.023	0.015		0.1131	0.2033	0.001	0.015		0.1126	0.0089
Flare Gas - K1060/1070 (NY Flare)	0.013	0.015		0.1274	0.1021										
Flare Gas - K3950 (SY Flare)	DNQ	0.015		0.1558	DNQ										

Compound: Selenium — Dates: 9/15/09-9/16/09

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	ND	0.150		0.1118	ND	ND	0.150		0.1113	ND	ND	0.150		0.1119	ND
Fuel Gas - V701	ND	0.150		0.1117	ND	ND	0.150		0.1121	ND	ND	0.150		0.1115	ND
Fuel Gas - V870	ND	0.150		0.1132	ND	ND	0.150		0.1131	ND	ND	0.150		0.1126	ND
Flare Gas - K1060/1070 (NY Flare)	ND	0.150		0.1274	ND										
Flare Gas - K3950 (SY Flare)	ND	0.150		0.1558	ND										

Compound: Vanadium — Dates: 9/15/09-9/16/09

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	ND	0.075		0.1118	ND	ND	0.075		0.1113	ND	ND	0.075		0.1119	ND
Fuel Gas - V701	ND	0.075		0.1117	ND	ND	0.075		0.1121	ND	ND	0.075		0.1115	ND
Fuel Gas - V870	ND	0.075		0.1132	ND	ND	0.075		0.1131	ND	ND	0.075		0.1126	ND
Flare Gas - K1060/1070 (NY Flare)	ND	0.075		0.1274	ND										
Flare Gas - K3950 (SY Flare)	ND	0.075		0.1558	ND										

Liquid HC and Gas Samples - Total Sulfur

Compound	Sulfur	
Source	Total Sulfur	
	wt %	mol ppm*
Liquid HC Samples Dates:7/13/09		
Crude Oil - Crude Unit	1.34	
Gas Oil - FCC	0.264	
Gas Oil - TKN	1.41	
Gas Oil - TKC	2.44	
Gas Samples Dates: 9/15/09-9/16/09		
Fuel Gas - V475-B		33.0
Fuel Gas - V701		39.5
Fuel Gas - V870		42.5
Flare Gas - K1060/1070 (NY Flare)		45,854
Flare Gas - K3950 (SY Flare)		20.5

Key:

RL: Reporting Limit
MDL: Method Detection Limit
MRL: Method Reporting Limit
J Flag: Estimated value. Analyte detected at a level less than the Reporting Limit, but greater than or equal to the Method Detection Limit
DNQ: Detected but Not Quantified. All gas samples were blank corrected and where blank value exceeded the measured value, DNQ was denoted.
ND: Not detected
dsl: dry standard liter
dscm: dry standard cubic meter at 29.92 " Hg, 68 Deg. F (760 mm Hg 20 Deg C)
ppbvd: parts per billion by volume on a dry basis
Conc: Concentration
* Limit of detection for analysis was 0.1 mol ppm. Convert to wt/wt ppm S by multiplying by factor of 2.

January 18, 2010

Richard Mitchell
Director, Planning and Building Services
City of Richmond
1401 Marina Way South
Richmond, CA 94804

Chevron Richmond Refinery
Conditional Use Permit Condition D2

Dear Mr. Mitchell:

This letter provides the test report for Six Element Sampling at Chevron's Richmond Refinery for the Fourth Quarter of 2009. This information is submitted pursuant to Condition D2 of Chevron's Conditional Use Permit, Number 1101974, for the Chevron Energy and Hydrogen Renewal Project.

Sampling was performed according to the protocol submitted to the City and BAAQMD in December 2008. The final set of analytical results for Fourth Quarter 2009 samples were received by Chevron from the analytical laboratories on January 15, 2010.

Please find attached ***Six Element Sampling Results Report for Quarter Ending December 31, 2009*** which summarizes the results for each sample analysis required by the D2 condition.

If you have any questions concerning this report, please contact Ms. Winnie Lieu at (510) 242-2742.

Sincerely,

Tery Lizarraga

Attachment:
Six Element Sampling Results Report for Quarter Ending December 31, 2009

Bcc:
Robert Chamberlain, Richmond Renewal Project
Rolf Lindenhayn, Richmond Renewal Project
ETC (c/o Matt Diaz)

Chevron Richmond Refinery
Conditional Use Permit Condition D2
Report for Quarter Ending: 12/31/09

Liquid Samples - Metals

Compound:	Chromium	Test Method: ICP-MS (EPA 1638)							Date: [illegible]			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit	ND	0.002	0.014		ND	0.002	0.015		ND	0.002	0.015	
Gas Oil - FCC	ND	0.002	0.015		ND	0.002	0.014		ND	0.002	0.014	
Gas Oil - TKN	ND	0.002	0.015		ND	0.002	0.015		ND	0.002	0.015	
Gas Oil - TKC	ND	0.002	0.014		ND	0.002	0.014		ND	0.002	0.015	

Compound:	Nickel	Test Method: ICP-MS (EPA 1638)							Date: [illegible]			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit	4.63	0.011	0.048		2.00	0.011	0.050		4.89	0.011	0.050	
Gas Oil - FCC	0.418	0.011	0.049		0.435	0.010	0.046		0.407	0.010	0.048	
Gas Oil - TKN	0.079	0.011	0.050		0.080	0.011	0.049		0.080	0.011	0.049	
Gas Oil - TKC	0.362	0.010	0.047		0.360	0.010	0.047		0.350	0.011	0.049	

Compound:	Selenium	Test Method: ICP-MS (EPA 1638)							Date: [illegible]			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit	ND	0.017	0.048		ND	0.018	0.050		ND	0.018	0.050	
Gas Oil - FCC	0.075	0.018	0.039		0.095	0.017	0.037		0.049	0.017	0.038	
Gas Oil - TKN	0.233	0.018	0.040		0.243	0.018	0.039		0.246	0.018	0.039	
Gas Oil - TKC	0.110	0.017	0.038		0.112	0.017	0.037		0.079	0.018	0.039	

Compound:	Vanadium	Test Method: ICP-MS (EPA 1638)							Date: [illegible]			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit	11.5	0.021	0.072		4.61	0.022	0.075		13.0	0.022	0.075	
Gas Oil - FCC	0.441	0.022	0.074		0.448	0.020	0.070		0.435	0.021	0.072	
Gas Oil - TKN	0.139	0.022	0.075		0.134	0.022	0.074		0.138	0.022	0.074	
Gas Oil - TKC	0.376	0.021	0.071		0.377	0.020	0.070		0.376	0.021	0.073	

Compound:	Mercury	Test Method: EPA 1631 (Cold Vapor Atomic Absorbance Spectrometry)							Date: [illegible]			
	Replicate 1				Replicate 2				Replicate 3			
Source	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag	Result mg/kg	MDL mg/kg	RL mg/kg	Flag
Crude Oil - Crude Unit	ND	0.00046	0.00297		ND	0.00046	0.00294		ND	0.00045	0.00292	
Gas Oil - FCC	ND	0.00044	0.00287		ND	0.00045	0.00289		ND	0.00046	0.00294	
Gas Oil - TKN	ND	0.00044	0.00286		ND	0.00044	0.00287		ND	0.00045	0.00293	
Gas Oil - TKC	ND	0.00045	0.00294		ND	0.00047	0.00303		ND	0.00044	0.00285	

Gas Samples - Metals

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	0.3875	0.12		0.1146	3.3824	ND	0.001		0.1142	ND	ND	0.001		0.1144	ND
Fuel Gas - V701	0.0004	0.002		0.1197	0.0033	ND	0.001		0.1153	ND	0.0831	0.001		0.1150	0.7226
Fuel Gas - V870	0.0066	0.002		0.1185	0.0554	0.0096	0.001		0.1178	0.0814	0.0103	0.001		0.1169	0.0881
Flare Gas - K1060/1070 (NY Flare)	ND	0.002		0.1275	ND										
Flare Gas - K3950 (SY Flare)	0.0081	0.002		0.1218	0.0665										

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	DNQ	0.003	J	0.1146	DNQ	DNQ	0.003	J	0.1142	DNQ	DNQ	0.003	J	0.1144	DNQ
Fuel Gas - V701	DNQ	0.003		0.1197	DNQ	DNQ	0.003	J	0.1153	DNQ	DNQ	0.003	J	0.1150	DNQ
Fuel Gas - V870	DNQ	0.003	J	0.1185	DNQ	ND	0.003		0.1178	ND	DNQ	0.003	J	0.1169	DNQ
Flare Gas - K1060/1070 (NY Flare)	DNQ	0.003	J	0.1275	DNQ										
Flare Gas - K3950 (SY Flare)	DNQ	0.003	J	0.1218	DNQ										

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	DNQ	0.015		0.1146	DNQ	DNQ	0.015		0.1142	DNQ	DNQ	0.015		0.1144	DNQ
Fuel Gas - V701	0.0240	0.015		0.1197	0.2005	DNQ	0.015		0.1153	DNQ	DNQ	0.015		0.1150	DNQ
Fuel Gas - V870	DNQ	0.015		0.1185	DNQ	DNQ	0.015		0.1178	DNQ	DNQ	0.015		0.1169	DNQ
Flare Gas - K1060/1070 (NY Flare)	DNQ	0.015		0.1275	DNQ										
Flare Gas - K3950 (SY Flare)	DNQ	0.015		0.1218	DNQ										

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	ND	0.150		0.1146	ND	ND	0.150		0.1142	ND	ND	0.150		0.1144	ND
Fuel Gas - V701	ND	0.150		0.1197	ND	ND	0.150		0.1153	ND	ND	0.150		0.1150	ND
Fuel Gas - V870	ND	0.150		0.1185	ND	ND	0.150		0.1178	ND	ND	0.150		0.1169	ND
Flare Gas - K1060/1070 (NY Flare)	ND	0.150		0.1275	ND										
Flare Gas - K3950 (SY Flare)	ND	0.150		0.1218	ND										

Source	Replicate 1 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 2 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm	Replicate 3 Result µg	MRL µg	Flag	Vol Gas Sampled dscm	Conc. µg/dscm
Fuel Gas - V475-B	ND	0.075		0.1146	ND	ND	0.075		0.1142	ND	ND	0.075		0.1144	ND
Fuel Gas - V701	ND	0.075		0.1197	ND	ND	0.075		0.1153	ND	ND	0.075		0.1150	ND
Fuel Gas - V870	ND	0.075		0.1185	ND	ND	0.075		0.1178	ND	ND	0.075		0.1169	ND
Flare Gas - K1060/1070 (NY Flare)	ND	0.075		0.1275	ND										
Flare Gas - K3950 (SY Flare)	ND	0.075		0.1218	ND										

Liquid HC and Gas Samples - Total Sulfur

Compound:	Sulfur	
Source	Total Sulfur	
	wt %	mol ppm*
Liquid HC Samples Dates: 12/2/09-12/13/09		
Crude Oil - Crude Unit	1.94	
Gas Oil - FCC	0.295	
Gas Oil - TKN	1.60	
Gas Oil - TKC	0.30	
Gas Samples Dates: 11/10/09-11/12/09		
Fuel Gas - V475-B		33.5
Fuel Gas - V701		41.6
Fuel Gas - V870		54.1
Flare Gas - K1060/1070 (NY Flare)		24.593
Flare Gas - K3950 (SY Flare)		23.714

Key:

RL: Reporting Limit
MDL: Method Detection Limit
MRL: Method Reporting Limit
J Flag: Estimated value. Analyte detected at a level less than the Reporting Limit, but greater than or equal to the Method Detection Limit
DNQ: Detected but Not Quantified. All gas samples were blank corrected and where blank value exceeded the measured value, DNQ was denoted.
ND: Not detected
dsl: dry standard liter
dscm: dry standard cubic meter at 29.92 " Hg, 68 Deg. F (760 mm Hg 20 Deg C)
ppbvd: parts per billion by volume on a dry basis
Conc: Concentration
* Limit of detection for analysis was 0.1 mol ppm. Convert to wt/wt ppm S by multiplying by factor of 2.

Attachment KR–7

Refinery capacity and utilization data excerpts: pages 8–37 from Bay Area Air Quality Management District Major Facility Review Permit (Title V Permit) issued to Valero Refining Co. Benicia Facility, as revised on 30 April 2013; and Attachment F-1 of San Francisco Bay Regional Water Quality Control Board Order No. R2-2015-0037, NPDES Permit No. CA0005550, issued to the Valero Benicia Refinery, as revised on 12 August 2015. (Permit orders referenced by the EIR.)

III. Generally Applicable Requirements

II. EQUIPMENT

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
S-1	Claus - modified 3 stage; Burns Multi-fuel; (SULFUR PLANT 'A' TRAIN ACID GAS BURNER, F-1301A)	Burners: John Zink Co.	Burners (4): DB-0-24	240 short tons/day (Condition # 20820, Part 42)	87,600 short tons/year (Condition # 20820, Part 42) (New Source Review)
S-2	Claus - modified 3 stage; Burns Multi-fuel; (SULFUR PLANT 'B' TRAIN ACID GAS BURNER, F-1301B)	Burners: John Zink Co.	Burners (4): DB-0-24	240 short tons/day (Condition # 20820, Part 42)	87,600 short tons/year (Condition # 20820, Part 42) (New Source Review)
S-5	Fluid cat cracker, FCC fresh feed, (FCCU REGENERATOR R-702)	Custom	N/A	80 kBBL/day fresh feed, daily maximum (Condition 20820, Part 46)	28.1 MMBBL/year fresh feed (based on 77 kBBL/day fresh feed, annual average) (Condition 20820, Part 46) (New Source Review)
S-6	Fluid coking - general, Coker fresh feed, (COKER BURNER R-902)	ER&E	N/A	39.6 kBBL/day fresh feed (design safety valve limit)	14.5 MMBBL/year fresh feed (39.6 kBBL/day) (Grandfathered Source)
S-7	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, JET FUEL HYDROFINING, F-103)	Burners: John Zink Co.	Burners (4): HEVD-18	12.72 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 53 MMBTU/hour) (Regulation 9, Rule 10 Compliance Plan)	4.64 MMtherms/year (annual throughput is based on an demonstrated actual hourly maximum firing rate of 53 MMBTU/hour) (Grandfathered Source)
S-8	Fluid coking - storage, Coker product, (Coke Storage Tanks TK-1902 A/B)	Custom	N/A	2400 tons/day (based on 100 tons/hour)	876 ktons/year (based on 2400 tons/day) (Condition 20820, Part 48) (New Source Review)
S-9	Blow-down system - w/o control, Crude oil (Vapor Recovery System)	Custom	N/A	180 kBBL/day, daily maximum (Condition 20820, Part 50)	60.2 MMBBL/year (based on 165 kBBL/day, annual average) (Condition

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					20820, Part 50) (New Source Review)
S-11	Storage, Carbon black, (Activated Carbon Bin TK-2061)	Custom	N/A	2.4 tons/day (based on 0.1 tons/hr)	292 tons/12-months (Condition #9897) (New Source Review)
S-13	Process Heater/Furnace, Refinery make gas (RMG) (Direct Fired Air Heater, Aux. Burner, F-702)	John Zink Co.	Burner (1): Z-38	14.4 ktherms/day (daily capacity is based on a burner design value of 60 MMBTU/hr)	Startup burner: No annual throughput limit is needed. (Grandfathered Source)
S-16	Refinery Waste Gas Flare, Natural gas, Refinery make gas (RMG) (ACID GAS FLARE)	John Zink Co.	Burners (3): QS-16	0.036 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 0.15 MMBTU/hour)	13.14 ktherms/year (based on actual hourly maximum firing rate of 0.15 MMBTU/hour) Pilot gas only (New Source Review)
S-17	Refinery Waste Gas Flare, Natural gas, Refinery make gas (RMG) (BUTANE FLARE, ST-1701)	John Zink Co.	Burners (2): STF-LH-127-30HF	0.024 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 0.10 MMBTU/hour)	8.76 ktherms/year (based on actual hourly max firing rate of 0.1 MMBTU/hour) Pilot gas only (Grandfathered Source)
S-18	Refinery Waste Gas Flare, Natural gas, Refinery make gas (RMG) (SOUTH FLARE, ST-2101)	John Zinc Co.	Burner: STF-SAS-1	0.336 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 1.40 MMBTU/hour)	122.6 ktherms/year (based on actual hourly maximum firing rate of 1.4 MM BTU/hour) Pilot gas only (Grandfathered Source)
S-19	Refinery Waste Gas Flare, Natural gas, Refinery make gas (RMG) (NORTH FLARE ST-2103)	John Zinc Co.	Burner: STF-SAS-1	0.336 ktherms/day (daily capacity is based on an demonstrated	122.6 ktherms/year (based on actual hourly maximum firing rate of 1.4 MM BTU/hour) Pilot gas only

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
				actual hourly maximum firing rate of 1.40 MMBTU/hour)	(Grandfathered Source)
S-20	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, NAPTHA HYDROFINING, F-104)	Custom	Burners (6): John Zink VYD-18	14.88 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 62 MM/BTU/hour) (Reg 9 Rule 10 Compliance Plan)	5.43 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 62 MMBTU/hour) (Grandfathered Source)
S-21	Furnace - Other, Refinery make gas (RMG) (Hydrogen Reformer Furnace, F-301) Either S-21 or S-22 To Be Removed From Service Upon Startup of S-1061 and S-1062 Hydrogen Reformer Furnaces per Condition 20820, Part 76	Custom	Burners: (980) Callidus LE-CARW-2 or John Zink LPMW 208-WC Ultra Low NOx (staged ULNB replacement)	147.36 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 614 MMBTU/hour) (Regulation 9, Rule 10 Compliance Plan)	106 MMtherms/365-days (combined w/S-22) (average of 605 MMBTU/hour per furnace) (Condition #10574-37) , Superseded by 53 MMtherms/365 days (average of 605 MMBtu/hr) (Condition # 24197, Part 37) effective upon startup of S-1061 and S-1062 (New Source Review)
S-22	Furnace - Other, Refinery make gas (RMG) (Hydrogen Reformer Furnace, F-351) Either S-21 or S-22 To Be Removed From Service Upon Startup of S-1061 and S-1062 Hydrogen Reformer Furnaces per Condition 20820, Part 76	Custom	Burners(980): Callidus LE-CARW-2 or John Zink LPMW 208-WC Ultra Low NOx (staged ULNB replacement)	147.36 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 614 MMBTU/hour) (Regulation 9, Rule 10 Compliance Plan)	106 MMtherms/365-days (combined w/S-21) (average of 605 MMBTU/hour per furnace) (Condition #10574-37) , Superseded by 53 MMtherms/365 days (average of 605 MMBtu/hr) (Condition # 24197, Part 37) effective upon startup of S-1061 and S-1062

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					(New Source Review)
S-23	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, GAS OIL HYDROCRACKING, F-401)	Custom	Burners (20): John Zinc Ultra Low NOx COOLstars-15	200 MMBTU/hour for any 1 hour period; 44.4 ktherms/day (average of 185 MMBTU/hour) (Condo. #14318) (Regulation 9, Rule 10 Compliance Plan)	16.21 MMtherms/year (average of 185 MMBTU/hour) (New Source Review)
S-24	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, CAT FEED HYDROFINING, F-601)	Custom	Burner (1): Exxon 50J	7.92 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 33 MMBTU/hour) (Regulation 9, Rule 10 Compliance Plan)	2.89 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 33 MMBTU/hour) (Grandfathered Source)
S-25	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, CAT FEED PREHEAT, F-701)	Custom	Burners (20): John Zink DBA-22	55.2 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 230 MMBTU/hour) (Regulation 9, Rule 10 Compliance Plan)	20.15 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 230 MMBTU/hour) (Grandfathered Source)
S-26	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, HCN HYDROFINING, F-801, 33 MMBTU/hr)	Custom	Burners (4): John Zink VPMR-20	7.92 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 33 MMBTU/hour) (Regulation 9,	2.89 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 33 MMBTU/hour) (Grandfathered Source)

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
				Rule 10 Compliance Plan)	
S-27	Waste gases; Other/not specified, Waste gases, Sodium hydroxide, 7 days/wk, 10 hrs/day, 52 wks/year (PFR REGENERATION FACILITIES)	Custom	N/A	22.56 MMSCF/day (based on 0.94 MMSCF/hour)	255.5 MMSCF/year (based on 70 kscf/hour for 10 hour/day – 365 day/year.) (Grandfathered Source)
S-29	Cooling tower, Fresh water, Water - process, other/not spec, (COOLING TOWER)	Deflon Anderson	5 DOP 4248-2615031 (5 cells)	85.5 MMgal/day circulation rate (based on 59.4 kgal/min)	31,220 MMgal/year (based on –85.5 MMgal/day circulation rate) (Grandfathered Source)
		Marley	2 cells		
S-30	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, PFR PREHEAT, F-2901)	Custom	Burners (12): John Zink HEVR-20P	[Sources 30-33 must sum to 463 MMBTU/hour = 111.12 ktherms/day] (Regulation 9, Rule 10 Compliance Plan)	40.56 MMtherms/year combined with S-31, S-32 and S-33 (average of 463 MMBTU/hour) (Grandfathered Source)
S-31	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, PFR REHEAT, F-2902)	Custom	Burners (12): John Zink HEVR-20P	[Sources 30-33 must sum to 463 MMBTU/hour = 111.12 ktherms/day] (Regulation 9, Rule 10 Compliance Plan)	40.56 MMtherms/year combined with S-30, S-32 and S-33 (average of 463 MMBTU/hour) (Grandfathered Source)
S-32	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, PFR REHEAT, F-2903)	Custom	Burners (9): John Zink HEVR-22P	[Sources 30-33 must sum to 463 MMBTU/hour = 111.12 ktherms/day] (Regulation 9, Rule 10 Compliance Plan)	40.56 MMtherms/year combined with S-30, S-31 and S-33 (average of 463 MMBTU/hour) (Grandfathered Source)
S-33	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, PFR REHEAT, F-2904)	Custom	Burners (7): John Zink HEVR-22	[Sources 30-33 must sum to 463 MMBTU/hour =	40.56 MMtherms/year combined with S-30, S-31 and S-32 (average

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Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
				111.12 ktherms/day] (Regulation 9, Rule 10 Compliance Plan)	of 463 MMBTU/hour) (Grandfathered Source)
S-34	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, GAS HEATER, F-2905)	Custom	Burners (9): John Zink HEVR-22P	17.76 ktherms/day (daily capacity is based on demonstrated actual hourly maximum firing rate of 74 MMBTU/hr) (9-10 Compliance Plan)	6.48 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 74 MMBTU/hour) (Grandfathered Source)
S-35	Process Heater/Furnace, Refinery make gas (RMG) (PROCESS FURNACE, GAS HEATER, F-2906)	Custom	Burners (3): John Zink HEVR-16P	3.36 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 14 MMBTU/hour) (9-10 Compliance Plan)	1.23 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 14 MMBTU/hour) (Grandfathered Source)
S-36	Industrial Boiler - Other, Refinery make gas (RMG) (WASTE HEAT BOILER, SG-701)	Custom	Burners (18): John Zink B-Y-2720	65.28 ktherms/day (daily capacity is based on maximum daily design firing rate of 272.0 MMBTU/hour)	Excluded from Regulation 9, Rule 10 – 23.83 MMtherms/year (throughput is based on an annualized daily firing rate of 272.0 MMBTU/hour) (Grandfathered Source)
S-37	Industrial Boiler - Other, Refinery make gas (RMG) (WASTE HEAT BOILER, SG-702)	Custom	Burners (18): John Zink B-Y-2720	65.28 ktherms/day (daily capacity is based on maximum daily design firing rate of 272.0 MMBTU/hour)	Excluded from Regulation 9, Rule 10 – 23.83 MMtherms/year (throughput is based on an annualized daily firing rate of 272.0 MMBTU/hour) (New Source Review)
S-40	Commercial/Institutional Boiler,	CE, Inc.	34VP-14W;	52.32	19.10 MMtherms/year

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Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
	Natural gas, Refinery make gas (RMG) (Utility Package Boiler, SG-2301, 218MMBTU/hr Horizontal force)	Burners: Coen	Burners: Daf-42 Low NOx	ktherms/day (based on a maximum firing rate of 218 MMBTU/hour) (Condition #9296 and 9-10 Compliance Plan)	(based on a maximum firing rate of 218 MMBTU/hour) (New Source Review) and MTBE Phaseout Application 2035
S-41	Industrial Boiler - Other, Natural gas, Refinery make gas (RMG) (Steam Generator, SG-2302)	CE, Inc.	34VP-14W; Burners (2): Type SV	52.32 ktherms/day (based on a maximum firing rate of 218 MMBTU/hour) (9-10 Compliance Plan)	19.10 MMtherms/year (based on a maximum firing rate of 218 MMBTU/hour) (Grandfathered Source)
S-43	Industrial Turbine (PROCESS GAS TURBINE, GT-401)	GE	Frame Size 3	34.42 ktherms/day (daily capacity is based on a design (winter temperature) hourly maximum firing rate of 143.4 MMBTU/hour)	11.6 MMtherms/year (throughput is based on a design (seasonal average temperature) maximum firing rate of 132.4 MMBTU/hour) (Grandfathered Source)
S-44	Industrial Turbine (PROCESS GAS TURBINE, GT-701)	GE	Frame Size 3	36.58 ktherms/day (daily capacity is based on a design (winter temperature) hourly maximum firing rate of 152.4 MMBTU/hour)	12.35 MMtherms/year throughput is based on a design (seasonal average temperature) maximum firing rate of 141.0 MMBTU/hour) (Grandfathered Source)
S-45	Industrial Turbine (PROCESS GAS TURBINE GT-702)	GE	Frame Size 5	78.6 ktherms/day (daily capacity is based on the maximum hourly firing rate of 327.5 MMBTU/hour)	28.7 MMtherms/year (throughput is based on the maximum annualized daily firing rate of 327.5 MMBTU/hour)

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Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
					Condition 20820, Part 46) (New Source Review)
S-46	Industrial Turbine (Process Gas Turbine, GT 1031 with steam injection)	GE	Frame Size 3	34.42 ktherms/day (daily capacity is based on a design (winter temperature) hourly maximum firing rate of 143.4 MMBTU/hour)	11.6 MMtherms/year (throughput is based on a design (seasonal average temperature) maximum firing rate of 132.4 MMBTU/hour) (Grandfathered Source)
S-48	Industrial Boiler - Other, Refinery make gas (RMG) (WASTE HEAT BOILER, SG-1031)	Custom	Burners (2): John Zink Y3748	65.28 ktherms/day (daily capacity is based on maximum daily design firing rate of 272.0 MMBTU/hour)	Excluded from Regulation 9, Rule 10 – 23.83 MMtherms/year (throughput is based on an annualized daily firing rate of 272.0 MMBTU/hour) (Grandfathered Source)
S-50	Process Heater/Furnace, Refinery make gas (RMG) (AIR HEATER, CKR AUX. BURNER, F-901)	John Zink	Burner: Z-38E	10.08 ktherms/day (capacity is based on a demonstrated actual hourly maximum firing rate of 42 MMBTU/hour)	Start up burner: No annual throughput limit is needed. (Grandfathered Source)
S-51	HCU Total Feed Sandfilter, FIL 410A	N/A	N/A	44.0 kBBL/day, daily maximum (Condition 20820, Part 53)	40.0 kb/day), annual average (Condition 20820, Part 53) (New Source Review)
S-52	HCU Total Feed Sandfilter, FIL 410B	N/A	N/A	44.0 kBBL/day, daily maximum (Condition 20820, Part 53)	40.0 kb/day) (Condition 20820, Part 53) (New Source Review)
S-55	Storage, Refinery sour waste water, (TK. 2801 SOUR WATER STORAGE)	N/A	N/A		5.61 MMBBL/year (based on 15.4 Kbbl/d) (Grandfathered Source)
S-56	Industrial Boiler - Other, Refinery	Custom	Burners (2): John	65.28	Excluded from

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Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
	make gas (RMG) (WASTE HEAT BOILER, SG-401)		Zink Y3748	ktherms/day (daily capacity is based on maximum daily design firing rate of 272.0 MMBTU/hour)	Regulation 9, Rule 10 - 23.83 MMtherms/year (throughput is based on an annualized daily firing rate of 272.0 MMBTU/hour) (Grandfathered Source)
S-57	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-58	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-59	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-60	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-61	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-62	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-63	Tank, External Floating Roof, GREEN, Gasoline - unleaded, Welded, Pontoon (TK-1711, GASOLINE COMP)	N/A	N/A	10920 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-67	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-68	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-72	Deleted. Removed from permit in				

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
	March 2007. Ownership transferred to Facility B5574.				
S-73	Tank, External Floating Roof, GREEN, Gasoline - unleaded, Welded, Pontoon (TK-1733, GASOLINE COMP)	N/A	N/A	5880 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-74	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-75	Tank, External Floating Roof, GREEN, Gasoline - unleaded, Welded, Pontoon (TK-1736, GASOLINE COMP)	N/A	N/A	3360 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-76	Tank, External Floating Roof, GREEN, Gasoline - unleaded, Welded, Pontoon (TK-1737, GASOLINE COMP)	N/A	N/A	5880 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-77	Tank, External Floating Roof, GOLD, Water/organics mixture, Welded, Pontoon (TK-1738, GASOLINE)	N/A	N/A	3360 kgal	7.4 MMBBL/365-day Gasoline (Based on prior MTBE production of 4.5 kBBL/day plus 5.8 MMBBL/year of MTBE receipts through S-207 (Grandfathered Source)
S-78	Tank, External Floating Roof, GREEN, Alkylate, Welded, Pontoon (TK-1739, GASOLINE COMPONENT)	N/A	N/A	6804 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-

II. Equipment

Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
					74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-79	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1751, GASOLINE)	N/A	N/A	5040 kgal	49.275 MMBBL/year combined with S-80, 82, 83, 84, 86 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-80	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1752, GASOLINE)	N/A	N/A	3780 kgal	49.275 MMBBL/year combined with S-79, 82, 83, 84, 86 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-81	Tank, External Floating Roof, GOLD, Water/organics mixture, Welded, Pontoon (TK-1753, SLOP/GASOLINE)	N/A	N/A	3654 kgal	8.21 MMBBL/year combined with S-85, 103 and 104 (actual) (Grandfathered Source)
S-82	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1754, GASOLINE)	N/A	N/A	3150 kgal	49.275 MMBBL/year combined with S-79, 80, 83, 84, 86 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-83	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1755, GASOLINE)	N/A	N/A	5040 kgal	49.275 MMBBL/year combined with S-79, 80, 82, 84, 86 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-84	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1756, GASOLINE)	N/A	N/A	3780 kgal	49.275 MMBBL/year combined with S-79, 80, 82, 83, 86 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-85	Tank, External Floating Roof, GOLD, Water/organics mixture, Waste oil,	N/A	N/A	1260 kgal	8.21 MMBBL/year combined with S-81,

II. Equipment

Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
	Welded, Pontoon (TK-1757, SLOP/GASOLINE)				103 and 104 (actual) (Grandfathered Source)
S-86	Tank, External Floating Roof, GOLD, Gasoline - unleaded, Welded, Pontoon (TK-1758, GASOLINE)	N/A	N/A	3150 kgal	49.275 MMBBL/year combined with S-79, 80, 82, 83, 84 and 92 (based on 135 kBBL/day) (Grandfathered Source)
S-87	Tank, Internal Floating Roof, WHITE, Gasoline - unleaded, Welded, Pan (TK-1759, GASOLINE)	N/A	N/A	650 kgal	13.0 MMBBL/year combined with S-88, 89, 90 and S-91 (based on combined total of 35.7 kBBL/day) (Grandfathered Source)
S-88	Tank, Internal Floating Roof, WHITE, Gasoline - unleaded, Welded, Pan (TK-1760, GASOLINE w/Primary and Secondary Seals)	N/A	N/A	307 kgal	13.0 MMBBL/year combined with S-87, 88, 90 and S-91 (based on combined total of 35.7 kBBL/day) (Grandfathered Source)
S-89	Tank, Internal Floating Roof, 6WHITE, Gasoline - unleaded, Welded, Pan (TK-1761, GASOLINE)	N/A	N/A	651 kgal	13.0 MMBBL/year combined with S-87, 88, 90 and S-91 (based on combined total of 35.7 kBBL/day) (Grandfathered Source)
S-90	Tank, Internal Floating Roof, WHITE, Gasoline - unleaded, Welded, Pan (TK-1762, GASOLINE w/liquid mounted primary and secondary seals)	N/A	N/A	307 kgal	13.0 MMBBL/year combined with S-87, 88, 89 and S-91 (based on combined total of 35.7 kBBL/day) (Grandfathered Source)
S-91	Tank, Internal Floating Roof, WHITE, Gasoline - unleaded, Welded, Pan (TK-1763, GASOLINE w/liquid mounted primary and secondary seals)	N/A	N/A	307 kgal	13.0 MMBBL/year combined with S-87, 88, 89 and S-90 (based on combined total of 35.7 kBBL/day) (Grandfathered Source)
S-92	Tank, External Floating Roof, GOLD, Fuel - jet 'A', Welded, Pontoon (TK-1771, JP4)	N/A	N/A	4620 kgal	49.275 MMBBL/year combined with S-79, 80, 82, 83, 84, 86 & 97 (based on 135

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					kBBL/day) (Grandfathered Source)
S-97	Tank, External Floating Roof, GOLD, Fuel - jet 'A', Welded, Pontoon (TK-1776, JP4)	N/A	N/A	4620 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-101	Tank, Internal Floating Roof, GOLD, Untreated Wastewater, Welded, Pan (TK-1791, w/ primary & secondary seals)	N/A	N/A	189 kgal	5 MMBBL/year (based on 400 gpm rate) (New Source Review)
S-103	Tank, Internal Floating Roof, GREEN, Water/organics mixture, Welded, Pan (TK-1793 SLOP)	N/A	N/A	676 kgal	8.21 MMBBL/year combined with S-81, 85, and 104 (actual) (Grandfathered Source)
S-104	Tank, External Floating Roof, GOLD, Organic liquid -other/not spec, Welded, Pontoon (TK-1795, SLOP)	N/A	N/A	3654 kgal	8.21 MMBBL/year combined with S-81, 85, and 103 (actual) (Grandfathered Source)
S-105	Tank, Internal Floating Roof, GOLD, Organic liquid -other/not spec, Welded, Pontoon (TK-1796, WWTP SLOP)	N/A	N/A	189 kgal	690.5 kBBL/year – Derived from Condition #8771 (Grandfathered Source)
S-106	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1797, SLOP)	N/A	N/A	76 kgal	548 kBBL/year (actual) (Grandfathered Source)
S-108	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1801, Additives)	N/A	N/A	16,800 gal	6.85 kBBL/year (Grandfathered Source)
S-110	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1803, HTA)	N/A	N/A	16,800 gal	260 kBBL/year (actual) (Grandfathered Source)
S-111	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1804, HTA)	N/A	N/A	71 kgal	5300 kBBL/year (actual) (Grandfathered Source)
S-112	Tank, Internal Floating Roof, GOLD, Organic liquid -other/not spec,	N/A	N/A	336 kgal	547.5 kBBL/year (based on 1.5 kBBL/day)

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Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
	Welded, Pan (TK-1805, TEL WASH)				(Grandfathered Source)
S-113	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1806, LUBRISOL)	N/A	N/A	2520 gal	85 BBL/year (Grandfathered Source)
S-114	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1807, GASOLINE RED DYE)	N/A	N/A	2520 gal	85 BBL/year (actual) (Grandfathered Source)
S-115	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1808, GASOLINE ORANGE DYE)	N/A	N/A	2520 gal	55 BBL/year (actual) (Grandfathered Source)
	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1810, CORROSION INHIBITOR)	N/A	N/A	6300 gal	200 BBL/year (actual) (Grandfathered Source)
S-120	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec,(TK-1813, METAL DEACT)	N/A	N/A	2520 gal	73 BBL/year (actual) (Grandfathered Source)
S-122	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK 1814, ADDITIVES)	N/A	N/A	2540 gal	85 BBL/year (Grandfathered Source)
S-124	Tank, Vertical Fixed Roof, GOLD, Paraffins - C3+, (TK-1735, PENTANES)	N/A	N/A	3360 kgal	3.28 MMBBL/year (average of 9.0 kBBL/day) (Grandfathered Source)
S-129	Loading, Ship, Ship, 7 Loading Arms (Total) and 3 Loading Arms (Gasoline), Multi-liquid, Unknown fill (Crude / Product Dock (renamed July 1995))	Continental EMSCO Loading arms	4 – CEHMA-10; 3 – CEHMA-6	240 kBBL/day (based on 10kBBL/hour)	9.39 MMBBL/year gasoline loaded (average of 25.7 kBBL/day) (Condition 1709, Part 1.b) (New Source Review)
S-131	Storage, Refinery sludge, (WASTE WATER SLUDGE TANK TK-2069)	N/A	N/A		29 MM gal/12-month Derived from Condition #8771 (Grandfathered Source)
S-132	Storage, Caustic waste, (Tk 2711, SPENT CAUSTICS)	N/A	N/A		325 kBBL/year (Grandfathered Source)
S-133	Storage, Acid - waste, (TK 2712, SPENT ACID)	N/A	N/A		219 kBBL/year (average of 600 BBL/day)

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Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					(Grandfathered Source)
S-134	Storage, Caustic waste, (TK 2713, SPENT CAUSTIC SURGE)	N/A	N/A		207 kBBL/year (Grandfathered Source)
S-143	Removed from service				
S-150	Refinery waste water, (PST- 2051, PRIMARY SLUDGE THICKENER)	N/A	N/A		3.19 MMBBL/year feed (design basis of 255 gpm) (Grandfathered Source)
S-151	Wastewater storage - ponds, Stormwater and process water, (Wastewater Equalization Pond)	N/A	N/A		S-151 contains diverted process/stormwater. Very low concentrations of HC bearing compounds would be detected in this water. For the most part these ponds are dry. No throughput limits would be applicable (Grandfathered Source)
S-154	Refinery sour waste water (WASTE WATER BIOXIDATION UNIT 2053A)	N/A	N/A	S-154, 155 and 169 Combined throughput limit of 89.1 kBBL/day (average of 2600 gpm)	32.5 MMBBL/year combined with S-155 and 169 (average of 2600 gpm) (Grandfathered Source)
S-155	Refinery sour waste water, (WASTE WATER BIOXIDATION UNIT 2053B)	N/A	N/A	S-154, 155 and 169 Combined throughput limit of 89.1 kBBL/day (average of 2600 gpm	32.5 MMBBL/year combined with S-154 and 169 (average of 2600 gpm) (Grandfathered Source)
S-156	Wastewater storage - ponds, (WASTE WATER RETENTION POND)	N/A	N/A		S-156 contains diverted process/stormwater. Very low concentrations of HC bearing compounds would be detected in this pond. For the most part these ponds are

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					normally dry. No throughput limits apply (Grandfathered Source)
S-157	Storage, Sulfur, (SULFUR STORAGE PIT AT SULFUR PLANTS)	N/A	N/A	480 short tons/day , daily maximum (Condition 20820, Part 44)	175,200 short tons/year (Condition 20820, Part 44) (New Source Review)
S-158	Tank, Vertical Fixed Roof, GOLD, Perchloroethylene (PERC), 7 ft diameter (TK 2902)	N/A	N/A	2300 gal	30 kgal/12-month (PERC) (Condition #9584) (New Source Review)
S-159	Other petroleum products; Other, Lube oil, (S.G.701 & G.T.701 Lube Oil Reservoir)	Custom	N/A	410.4 kgal/day (average. of 17.1 kgal/hour)	149.8 MMgal/year (based on 410.4 kgal/day) (Grandfathered Source)
S-160	Other petroleum products; Other, Lube oil, 7 days/wk, 24 hours/day, 2 wks/year (SEAL OIL SPARGER FOR COMPRESSOR C1031)	Custom	N/A	38.4 kgal/day (average. of 1.6 kgal/hour)	14.0 MMgal/year (based on 38.4 kgal/day) (Grandfathered Source)
S-161	Separator - oil/water, Waste water, (OILY WATER SEWER PIPELINE)	N/A	N/A		Throughput limit not prudent for sewer system which handles both oily water and stormwater (Grandfathered Source)
S-163	Tank, External Floating Roof, GOLD, Waste oil, Gasoline - unleaded, Welded, Pontoon (TK 1732, GASOLINE COMPONENT)	N/A	N/A	3780 kgal	62.8 MMBBL/year [combined limit for Facility B5574 source S-74 and Facility B2626 sources S-63, 73, 75, 76, 78, 97 and 163] (based on combined total of 172.1 kBBL/day) (Grandfathered Source)
S-165	GDF, vehicle, non-retail-fee, balance (Phase 2), 2 tanks, 1 exempt nozzle, 1 gasoline nozzle (GDF #6764)	Nozzle: Gilbarco Balance System: Emco Wheaton	Nozzle: 625-100 Balance System: #A3003		111 kGal/year (Condition 22323) (New Source Review)
S-167	Other petroleum products; Other,	N/A	N/A	25.1 kgal/day	9.15 MMgal/year

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Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
	Oil - non-fuel, other/not spec, 6.6 tons/hour max, 7 days/wk, 24 hours/day, 50 wks/year (Seal Oil Sparger for Compressor C-401)			(average. of 17.4 gpm)	(based on 25.1 kgal/day) (Grandfathered Source)
S-168	Other petroleum products; Other, Paraffins - C3+, 1.7 N/A/hour max, 7 days/wk, 24 hours/day, 50 wks/year (SEAL OIL SPARGER FOR COMPRESSOR C-2901)	N/A	N/A	21.6 kgal/day (average of 15 gpm)	7.9 MMgal/year (based on 21.6 kgal/day) (Grandfathered Source)
S-169	Other process/not specified, Refinery waste water, 1.25 thou barrels/hour max, 7 days/wk, 24 hours/day, 52 wks/year (Third Bioxidation Unit)	Custom	N/A	S-154, 155 and 169 Combined throughput limit of 89.1 kBBL/day (average of 2600 gpm)	32.5 MMBBL/year combined with S-154 and 155 (based on 89.1 kBBL/day) (New Source Review)
S-173	Process Heater/Furnace, Refinery make gas (RMG) (Coker Steam Superheat Furnace F-902)	Burners: John Zink	PVYD SF 16 (or equivalent)	5.28 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum firing rate of 20MMBTU/hour (HHV)) (Regulation 9, Rule 10 Compliance Plan)	1.93 MMtherms/year (throughput is based on an demonstrated actual hourly maximum firing rate of 20 MMBTU/hour (HHV)) (New Source Review)
S-174	Material Handling/Miscellaneous, Lime, (TK 2321, Lime Slurry)	N/A	N/A	75 tons/day	4,562.5 tons/year (New Source Review)
S-175	Material Handling/Miscellaneous, Lime, (TK 2322, Lime Slurry)	N/A	N/A	75 tons/day	4,562.5 tons/year (New Source Review)
S-176	Material handling - other/not, Salt, (TK 2325, Brine Saturator)	Scienco (or equivalent)	N/A	50 tons/day	600 tons/year (New Source Review)
S-177	Removed from Service				
S-180	Removed from Service				
S-188	Separator - oil/water, Waste water, (Oil/Water/Sediment Separator)	WEMCO	Pacesetter	24 kBBL/day (permit limit)	8.76 MMBBL/year (permit limit) (New Source Review)
S-189	Separator - oil/water, Waste water, (Induced Static Flotation Cell)	L'eau Claire Int'l	75x	24 kBBL/day (permit limit)	8.76 MMBBL/year (permit limit) (New Source Review)

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
S-193	Other petroleum products; Other, Waste water (TK 2027, Diversion)	N/A	N/A		37.5 MMBBL/year combined with S-196 (total of 3000 gpm) (New Source Review)
S-194	Separator - oil/water, Waste water, (Oil/Water/Sediment Separator #2006)	WEMCO	Pacesetter	102.9 kBBL/day combined with S-195	37.5 MMBBL/year combined with S-195 (total of 3000 gpm) (New Source Review)
S-195	Separator - oil/water, Waste water (Oil/Water/Sediment Separator #2056)	WEMCO	Pacesetter	102.9 kBBL/day combined with S-194	37.5 MMBBL/year combined with S-194 (total of 3000 gpm) (New Source Review)
S-196	Other petroleum products; Other, Waste water (TK 2077, Diversion)	N/A	N/A		37.5 MMBBL/year combined with S-193 (total of 3000 gpm) (New Source Review)
S-197	Separator - oil/water, Waste water (Induced Static Flotation Cell #2007)	L'eau Claire Int'l	unknown	102.9 kBBL/day combined with S-198	37.5 MMBBL/year combined with S-198 (total of 3000 gpm) (New Source Review)
S-198	Separator - oil/water, Waste water (Induced Static Flotation Cell #2057)	L'eau Claire Int'l	unknown	102.9 kBBL/day combined with S-197	37.5 MMBBL/year combined with S-197 (total of 3000 gpm) (New Source Review)
S-199	Other petroleum products; Other, Oil/water mixture, (Oil Collection Drum D-2055)	N/A	N/A	1300 gal	41.7 kBBL/year (based on 200 gal/hour) (New Source Review)
S-200	Other petroleum products; Other, Oil/water mixture, (Collection Drum D-2056)	N/A	N/A	2300 gal	2.50 MMBBL/year (design basis of 200 gpm) (New Source Review)
S-202	Loading, Truck, 1 Loading Arm (Total), Crude oil, Bottom/Submerged fill (Vacuum Truck Loading from Tank (S-131))	N/A	N/A	79.5 kgal/day	29 MMgal/year Derived from Condition #8771 (New Source Review)
S-205	Other petroleum products; Other, Waste water (Surge Tank #2026)	N/A	N/A		37.5 MMBBL/year combined with S-206 (total of 3000 gpm) (New Source Review)
S-206	Other petroleum products; Other, Waste water (Surge Tank #2076)	N/A	N/A		37.5 MMBBL/year combined with S-205

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
					(total of 3000 gpm) (New Source Review)
S-207	Tank, External Floating Roof, GOLD, Mogas/Components, Welded, Pontoon (Tk 1740)	N/A	N/A	14,700 kgal	16.9364 MMBBL/365-day (mogas/components) (Condition #10797) (New Source Review) and MTBE Phaseout Application 2035
S-208	Other, Petroleum products - other/not spec, (Coker Feed Drum D-920)	N/A	N/A		29 MMgal/12-month (Condition #8771) (New Source Review)
S-209	Loading, Truck, 5 Loading Arms (Total), Bottom/Submerged fill Ethanol service.	N/A	"Dry-break" nozzles		6,620 trucks/12-month (Condition #9296) (New Source Review)
S-210	Tank, Internal Floating Roof, - UN, Ethanol, Welded (TK-1820)	N/A	N/A	630 kgal	1,303 kBBL ethanol/ rolling 12-month (Condition #9296) (New Source Review)
S-211	Alkylate Debutanizer T-4302 (in former MTBE unit)	N/A	N/A	22.8 kBBL/day alkylate (limit based on S-1007 capacity.)	8.32 MMBBL/year (based on 22.8 kBBL/day alkylate) (New Source Review) and MTBE Phaseout Application 2035
S-220	Combustion, Furnace - Other, Refinery make gas (RMG) (F-4460 Hot Oil Furnace)	Custom	N/A	84.24 ktherms/day (daily capacity is based on an demonstrated actual hourly maximum rate of 351 MMBTU/hour) (9-10 Compliance Plan)	28.908 MMtherms/365-day (Condition #10574, Part 29), Superseded by Condition 24197, Part 29, effective upon startup of S-1061 and S-1062 (New Source Review)
S-227	Tank, Vertical Fixed Roof, GOLD, Multi-liquid, (C5/Heartcut/Mogas Component Storage Tank)	N/A	N/A	7350 kgal	3.14 MMBBL/year (average. of 8.6 kBBL/day) (New Source Review)

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
S-236	Product Sulfur Tank 1901	N/A	N/A	480 short tons/day , daily maximum (Condition 20820, Part 44)	175,200 short tons/year (based on 480 short tons/day) per Condition 20820, Part 44 (New Source Review)
S-237	BOILER-SG1032	Babcock & Wilcox; Burners: Todd	Type D; Burners: Veriflame SV925 IGO	75.60 ktherms/day average of 315 MMBTU/hour (Condition #16027-19)	25.0536 MMtherms in any 365 consecutive day period (average of 286 MMBTU/hour) (Condition #16027-18) (New Source Review)
S-239	Crude/Product dock Sump (TK-1918)	N/A	N/A	3100 gal	360 kgal/year (Condition 18422, Part 1) (New Source Review)
S-241	Emergency Diesel Engine for Crude Field Firewater Pump, (P-2602)	Cummins	NT-855-FS, 230 HP		<34 hours/year reliability-related activities (Grandfathered Source)
S-242	Emergency Diesel Engine for Dock Firewater Pump (P-2607B)	Cummins	NT855-F3, 340 HP		<34 hours/year reliability-related activities (Grandfathered Source)
S-243	Emergency Diesel Engine for Control Room Standby Power (DG-5101)	Detroit Diesel	Series 92, Model 8163-7405, 1095 HP		<20 hours/year reliability-related activities (Condition 24375, Part 1) (New Source Review)
S-247	F-5401 Reactor Charge Heater, ULSD Unit	Burners: Callidus	CUBL-W	21.95 MMBtu/hr (Condition 22949, Part 16)	192,282 MMBTU/year (365 day consecutive period) (Condition 22949, Part 16) (New Source Review)
S-248	F-5402 Stripper Reboiler Heater, ULSD Unit	Burners: Callidus	CUBL-W	35.10 MMBtu/hr (Condition 22949, Part 16)	307,476 MMBTU/year (365 day consecutive period) (Condition 22949, Part 16) (New Source Review)

II. Equipment

Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
S-251	Emergency Diesel Engine, DG-5301 for Administrative Building Standby Power	Cummins	QSL9-G3 NR3, 399 HP		< 50 hours/year reliability-related activities (Condition 24309, Part 1) (New Source Review)
S-252	Diesel Engine Driving Fire Pump for Raw Water Break Tank TK-2401	Caterpillar	Model C18, 600 BHP		< 50 hours/year reliability-related activities (Condition 24310, Part 5) (New Source Review)
S-1002	Hydrotreating/hydrofining, Diesel oil, (DIESEL HYDROFINER)	N/A	N/A	14.0 kBBL/day feed (design safety valve limit)	5.1 MMBBL/year feed (14.0 kBBL/day) (Grandfathered Source)
S-1003	Hydrocracking, Distillate oil, 7 days/wk, 24 hours/day, 48 weeks/year (HYDROCRACKER)	N/A	N/A	44.0 kBBL/day, daily maximum (Condition 20820, Part 53)	40.0 kBBL/day, annual average) (Condition 20820, Part 53) (New Source Review)
S-1004	Catalytic reforming, Reformate, (CATALYTIC REFORMER-(PFR))	N/A	N/A	39.8 kBBL/day (Condition 20820, Part 55)	14.5 MMBBL/year feed (based on 39.8 kBBL/day) (Condition 20820, Part 55) (New Source Review)
S-1005	Hydrotreating/hydrofining, Gas oil, (CAT. FEED HYDROFINER)	N/A	N/A	41.4 kBBL/day feed (design feed pump)	15.1 MMBBL/year (41.4 kBBL/day) (Grandfathered Source)
S-1006	Distillation - crude, Crude oil, (CRUDE UNIT WITH 55E6 BTU/hour HEAT EXCHANGER)	N/A	N/A	180 kBBL/day, daily maximum (Condition 20820, Part 50)	60.2 MMBBL/year (based on 165 kBBL/day, annual average) (Condition 20820, Part 50) (New Source Review)
S-1007	Alkylation, Alkylate, (ALKYLATION UNIT)	N/A	N/A	22.8 kBBL/day (limit based on A/N 3782)	8.32 MMBBL/year (based on 22.8 kBBL/day per A/N 3782) (New Source Review)
S-1008	Hydrotreating/hydrofining, Gasoline - leaded, Gasoline - unleaded, (GASOLINE HYDROFINER)	N/A	N/A	35.0 kBBL/day feed (unit hydraulic limit)	12.8 MMBBL/year feed based on a design rate of 35.0 kBBL/day. (Grandfathered Source)
S-1009	Hydrotreating/hydrofining, Fuel - jet	N/A	N/A	17.9 kBBL/day	6.5 MMBBL/year feed

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
	'A', (JET FUEL HYDROFINER)			feed (design safety valve limit)	(17.9 kBBL/d) (Grandfathered Source)
S-1010	Hydrogen manufacturing, Refinery make gas (RMG), (HYDROGEN PLANT)	N/A	N/A	164 MMscf/day combined product hydrogen from both A and B trains (CFP duty permit limit), Superseded by 190 MMscf/day, daily maximum combined product hydrogen from A or B train and S-1062 (Condition 20820, Part 57) upon startup of S-1062 Hydrogen Plant	59,900 MMscf/year combined product H2 (164 MMScf/day) (Grandfathered Source), Superseded by 69,350 MMscf/year combined product hydrogen from A or B train and S-1062 (based on 190 MMscf/day) (Condition 20820, Part 57), upon startup of S-1062 Hydrogen Plant (New Source Review)
S-1011	Hydrotreating/hydrofining, Refinery feedstock -other/not spec, (HEAVY CAT NAPHTHA HYDROFINER)	N/A	N/A	25.0 kBBL/day (design safety valve limit)	9.1 MMBBL/year (25.0 kBBL/day) (Grandfathered Source)
S-1012	Feedstock; Other/not specified, Petroleum products -other/not spec, (Dimersol Unit)	N/A	N/A	7 kBBL/day feed (Condition 20820, Part 59)	2.555 MMBBL/year (based on 7 kBBL/day) (Condition 20820, Part 59) (New Source Review)
S-1013	Tank, Pressure, YELLOW, Hexane, Organic liquid -other/not spec, (Dimersol Unit - (D2720) EADC 10.0 kgal Tank)	N/A	N/A	10 kgal	2.84 kBBL/year (design pump limit) (New Source Review)
S-1014	Feedstock; Other/not specified, (Cat Light Ends Process Unit)	N/A	N/A	90.0 kBBL/day total feed (design limit)	32.8 MMBBL/year total feed (90.0 kBBL/day) (Grandfathered Source)
S-1020	Distillation - other, Refinery feedstock -other/not spec, 100 thou barrels/day max, (Heartcut Tower)	N/A	N/A	100 kBBL/day	36.5 MMBBL/year (based on 100 kBBL/day) (New Source Review)
S-1021	Hydrotreating/hydrofining, Refinery feedstock -other/not spec, 100 thou barrels/day max, (Heartcut Saturation Unit)	N/A	N/A	100 kBBL/day	36.5 MMBBL/year (based on 100 kBBL/day) (New Source Review)

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Table II A - Permitted Sources

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S-#	cription	Make or Type	Model	Capacity	Throughput
S-1022	Distillation - other, Refinery feedstock -other/not spec, 100 thou barrels/day max, (Cat. Reformer T-90 Tower)	N/A	N/A	100 kBBL/day	36.5 MMBBL/year (based on 100 kBBL/day) (New Source Review)
S-1023	Distillation - other, Refinery feedstock -other/not spec, 100 thou barrels/day max, (Cat. Naphtha T-90 Tower)	N/A	N/A	100 kBBL/day	36.5 MMBBL/year (based on 100 kBBL/day) (New Source Review)
S-1024	Hydrotreating/hydrofining, Refinery feedstock -other/not spec, 24 thou barrels/ day max, (Light Cat. Naphtha Hydrotreater)	N/A	N/A	24 kBBL/day	8.76 MMBBL/year (based on 24 kBBL/day) (New Source Review)
S-1026	Distillation - other, Refinery feedstock -other/not spec, 100 thou barrels/day max, (C5/C6 Splitter)	N/A	N/A	100 kBBL/day	36.5 MMBBL/year (based on 100 kBBL/day) (New Source Review)
S-1027	Pentane Rail Car Loading Rack	N/A	N/A	22,500 bbls/day	8.2125 MM Bbl/year Condition #17835 (New Source Review)
S-1030	Combustion Turbine Generator (Refinery Fuel Gas and/or Natural Gas Fired)	General Electric	LM 6000	500 MMBTU/hour	6,351,000 MMBTU/year (combined S-1030 & S-1031) (New Source Review)
S-1031	Heat Recovery Steam Generator	N/A	Duct Burner Supplemental Firing System	310 MMBTU/hour	6,351,000 MMBTU/year (combined S-1030 & S-1031) (New Source Review)
S-1034	Deisobutanizer, Butamer Unit (T-4801)	N/A	N/A	5 kBBL/day, daily average IC4 production rate (Condition 24080, Part 3)	1,825 kBBL/year IC4 production rate (Condition 24080, Part 3) (New Source Review)
S-1035	Reactor Effluent Stripper, Butamer Unit (T-4802)	N/A	N/A	N/A – Capacity of S-1035 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3)	N/A – Capacity of S-1035 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3)(New Source Review)
S-1036	Stripper Tower, ULSD Unit (T-5401)	Pressure	N/A	25 kBBL/day, daily	9.1 MMBBL/year (based

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
		Vessel, Tower		average (Condition 22949, Part 20)	on 25 kBBL/day, daily average) (New Source Review)
S-1047	Tank, External Floating Roof, Crude Oil (TK-1707)	N/A	N/A	27,300 kgals	62.6 MM MMBBL/year, combined with S-57 through S-62 at Facility B5574, and S-1048 (based on 171.5 kBBL/day, annual average) (Condition 20820, Part 32) (New Source Review)
S-1048	Tank, External Floating Roof, Crude Oil (TK-1708)	N/A	N/A	27,300 kgals	62.6 MM MMBBL/year, combined with S-57 through S-62 at Facility B5574, and S-1047 (based on 171.5 kBBL/day, annual average) (Condition 20820, Part 32) (New Source Review)
S-1049	Reactor, N-Butane Conversion, Butamer Unit (R-4803A)	N/A	N/A	N/A – Capacity of S-1049 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3)	N/A – Throughput of S-1049 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3) New Source Review)
S-1050	Reactor, N-Butane Conversion, Butamer Unit (R-4803B)	N/A	N/A	N/A – Capacity of S-1049 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3)	N/A – Capacity of S-1049 represented by Deisobutanizer, Butamer Unit, S-1034 (Condition 24080, Part 3) (New Source Review)
S-1051	Diolefin Reactor, ULSD Unit (R-5401)	Pressure Vessel, Reactor	N/A	25 kBBL/day, daily average (Condition 22949, Part 21)	9.1 MMBBL/year (based on 25 kBBL/day, daily average) (New Source Review)
S-1052	Hydrotreating Reactor, ULSD Unit (R-5402)	Pressure Vessel, Reactor	N/A	25 kBBL/day, daily average (Condition 22949,	9.1 MMBBL/year (based on 25 kBBL/day, daily average)

II. Equipment

Table II A - Permitted Sources

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities pursuant to 2-1-301. Throughput limits for grandfathered sources function as reporting thresholds as described in Standard Condition J.

S-#	cription	Make or Type	Model	Capacity	Throughput
				Part 21)	(New Source Review)
S-1058	Feedstock. Other/not specified, (Virgin Light Ends Process Unit)	N/A	N/A	65 kBBL/day	19.7 MMBBL/year total feed (54 kBBL/day) (Grandfathered Source)
S-1059	Industrial Boiler - Other, Carbon monoxide, Refinery make gas (RMG) (PROCESS FURNACE, CRUDE PREHEAT, F-105)	N/A	NA	529 MMBtu/hr	4,634,400 MMBtu/year (Condition 20820, Part 71) (New Source Review)
S-1060	Industrial Boiler - Other, Carbon monoxide, Refinery make gas (RMG) (PROCESS FURNACE, CRUDE PREHEAT, F-106)	N/A	NA	259 MMBtu/hr	2,268,840 MMBtu/year (Condition 20820, Part 71) (New Source Review)
S-1061	Furnace - Other, Refinery make gas (RMG) (Hydrogen Reformer Furnace, F-5501)	N/A	Low NOx Burners	980 MMBtu/hr (Condition 20820, Part 18.2)	8,584,800 MMBtu/year (Condition 20820, Part 18.1) (New Source Review)
S-1062	Hydrogen Unit with Pressure Swing Adsorption (PSA)	N/A		190 MMscf/day combined product hydrogen with S-1010 A or B train (Condition 20820, Part 57)	69,350 MMscf/year combined product hydrogen with S-1010 A or B (based on 190 MMscf/day) (Condition 20820, Part 57) (New Source Review)
S-1063	Alkylation Hydrogenator Guard Beds, F-4301 and R-4301A/B	N/A	N/A	20 kBBL/day (limit based on A/N 22082)	7.3 MMBBL/year (limit based on A/N 22082) (New Source Review)

Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
S-64	Tank, External Floating Roof, GREEN, Gas oil, Welded, Pontoon (TK-1712, GAS OIL)	N/A	N/A	13524 kgal	Exempt (Regulation 2-1-123.3.2)
S-65	Tank, Vertical Fixed Roof, ALUMSP, Distillate oil, (TK-1713, RESID)	N/A	N/A	5250 kgal	Exempt (Regulation 2-1-123.3.2)

II. Equipment

Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
S-66	Tank, External Floating Roof, Distillate oil, Welded, Pontoon (TK-1714, GAS OIL)	N/A	N/A	8400 kgal	Exempt (Regulation 2-1-123.3.2)
S-69	Tank, Vertical Fixed Roof, ALUMSP, Distillate oil, Gas oil, (TK-1717, RESID)	N/A	N/A	5250 kgal	Exempt (Regulation 2-1-123.3.2)
S-70	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-71	Deleted. Removed from permit in March 2007. Ownership transferred to Facility B5574.				
S-93	Tank, Vertical Fixed Roof, GREEN, Fuel - jet 'A', (TK-1772, JP5)	N/A	N/A	4620 kgal	Exempt (Regulation 2-1-123.3.2)
S-94	Tank, Vertical Fixed Roof, GREEN, Fuel - jet 'A', (TK-1773, JP5)	N/A	N/A	1050 kgal	Exempt (Regulation 2-1-123.3.2)
S-95	Tank, Vertical Fixed Roof, GOLD, Distillate oil, (TK-1774, DIESEL)	N/A	N/A	3150 kgal	Exempt (Regulation 2-1-123.3.2)
S-96	Tank, Vertical Fixed Roof, GOLD, Distillate oil, (TK-1775, DIESEL)	N/A	N/A	3150 kgal	Exempt (Regulation 2-1-123.3.2)
S-98	Tank, Vertical Fixed Roof, WHITE, Distillate oil, (TK-1777, DIESEL)	N/A	N/A	651 kgal	Exempt (Regulation 2-1-123.3.2)
S-99	Tank, Vertical Fixed Roof, GREEN, Fuel - jet 'A', (TK-1778, ETFA)	N/A	N/A	2373 kgal	Exempt(Regulation 2-1-123.3.2)
S-100	Tank, Vertical Fixed Roof, GREEN, Fuel - jet 'A', (TK-1779, ETF-A)	N/A	N/A	2373 kgal	Exempt(Regulation 2-1-123.3.2)
S-107	Tank, Vertical Fixed Roof, GOLD, Distillate oil, (TK-1798, DIESEL (FUEL OIL))	N/A	N/A	4410 kgal	Exempt (Regulation 2-1-123.3.2)
S-109	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1802, GASOLINE ANTI-OXIDANT)	N/A	N/A	16,800 gal	Exempt-additive
S-116	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1809, PETROX)	N/A	N/A	39 kgal	Exempt-additive
S-118	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1811, AO33)	N/A	N/A	17 kgal	Exempt-additive
S-119	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (TK-1812, ANTI-ICE)	N/A	N/A	16,800 gal	Exempt-additive

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Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
S-121	Tank, Vertical Fixed Roof, GOLD, Organic liquid -other/not spec, (D-807, POLYSULFIDE DRUM)	N/A	N/A	6468 gal	Exempt-additive
S-123	Tank, Vertical Fixed Roof, GOLD, (TK-1794,) Diesel Red Dye	N/A	N/A	8400 gal	Exempt (Regulation 2-1-123.3.2)
S-127	Loading, Motor Vehicle, Motor Vehicle Refueling Station, 1 Loading Arms (Total) and 0 Loading Arms (Gasoline), Distillate oil, Bottom/Submerged fill (DIESEL DISPENSER, SERVICES BLDG AREA)	Gilbarco Loading Arm	625-100		Exempt (Regulation 2-1-123.3.2)
S-140	Tank, Vertical Fixed Roof, YELLOW, Alcohol - amine, (TK 1204, MEA INVENTORY)	N/A	N/A	10600 gal	Exempt (Regulation 2-1-123.3.2)
S-142	Tank, Vertical Fixed Roof, YELLOW, Fresh Caustic, TK-103	N/A	N/A	7 kgal	Exempt (Regulation 2-1-123.2)
S-145	Tank, Vertical Fixed Roof, YELLOW, Alcohol - amine, (TK 1201, – MDEA ACCUMULATOR (20% SOLUTION))	N/A	N/A	47 kgal	Exempt (Regulation 2-1-123.3.2)
S-171	Tank, Vertical Fixed Roof, YELLOW Out of Service	N/A	N/A	500 gal	Exempt
S-180	Tank, Vertical Fixed Roof, WHITE, Out of Service	N/A	N/A	3 kgal	Exempt
S-185	Tank, Vertical Fixed Roof, UN, Organic liquid - other/not spec, (Cationic Polymer Tank)	N/A	N/A	5 kgal	Exempt (Regulation 2-1-123.3.2)
S-192	Other petroleum products; Other, Waste water (TK2052, Thickener)	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-201	Loading, Truck, 1 Loading Arm (Total), Waste water, Bottom/Submerged fill (Vacuum Truck Loading from Thickener Tank (S-192))	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-214	Process drain - w/o controls, Waste water - (BIOX Aerator for Stripped Sour Water)	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-215	Process drain - w/o controls, Waste water - (BIOX Clarifier for Stripped Sour Water)	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-217	Tank, Vertical Fixed Roof, BLACK, Refinery sludge, (WWTP Sludge Tank)	N/A	N/A	22 kgal	Exempt (Regulation 2-1-123.2)

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Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
S-218	Tank, Vertical Fixed Roof, BLACK, Refinery sludge, (WWTP Sludge Tank)	N/A	N/A	22 kgal	Exempt (Regulation 2-1-123.2)
S-219	Tank, Vertical Fixed Roof, BLACK, Refinery sludge, (WWTP Sludge Tank)	N/A	N/A	22 kgal	Exempt (Regulation 2-1-123.2)
S-230	TK-4460 Dowtherm Storage Tank	N/A	N/A		Exempt (Regulation 2-1-123.3.2)
S-231	Aqueous Ammonia Storage Drum	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-238	BIOX Aerator for stripped sour water TK-2083	N/A	N/A		Exempt (Regulation 2-1-123.2)
S-244	Tank, Vertical Fixed Roof, YELLOW, Aqueous Cationic Polymer Solution Tank TK-2317	N/A	N/A	5500 gallons	Exempt (Regulation 2-1-123.3.3)
S-245	Membrane Filtration Unit	Zenon	ZeeWeed MBR	400 gpm	Exempt (Regulation 2-1-123.2)
S-249	Manifolded Demulsifier Totes – OM13 (4 totes for P101's)	N/A	N/A	2,200 gal total (550 gal each)	Exempt (Regulation 2-1-123.3.2)
S-250	Manifolded Demulsifier Totes - Dock (3 totes)	N/A	N/A	790 gal total (2@230 gal, 1@330 gal)	Exempt (Regulation 2-1-123.3.2)
S-1019	Other petroleum products; Other (Laboratory Sample Waste Sinks)	N/A	N/A		Exempt
S-1046	Desalter	Custom	N/A		Exempt (Regulation 2-1-103)
S-32000	Combustion, Minor Sources, Natural gas (MINOR SOURCES)	N/A	N/A		Pilot gas to combustion devices, excluding flares - Exempt
S-32100	Refinery vacuum products (Fugitive Sources - Vacuum Producing Systems)	N/A	N/A		Exempt
S-32101	Refinery process vessels (Fugitive Sources – Process Vessel Depressurization)	N/A	N/A		Exempt
S-32102	Refinery valves/flanges (Fugitive Sources – Valves and Flanges)	N/A	N/A		Exempt
S-32103	Refinery pumps/compressors (Fugitive	N/A	N/A		Exempt

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Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
	Sources - Pumps & Compressor Seals)				
S-32104	Refinery pressure relief valve (Fugitive Sources - Pressure Relief Valves)	N/A	N/A		Exempt
S-32105	Refinery process drains (Fugitive Sources – Process Drains)	N/A	N/A		Exempt
S-32110	Refinery flaring/blowdown (Process Gas (Combustion) Emissions from Flares and Blowdown Systems)	N/A	N/A		Exempt
None	TK-1730 Flushing Oil Tank	N/A	N/A		Exempt
None	TK-1721 LPG Sphere	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	TK-1722 LPG Sphere	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	TK-1723 LPG Sphere	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	TK-1724 LPG Sphere	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	TK-1725 LPG Sphere	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	TK-1726 Refrigerated Butane Tank	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	D-1907 Methyl Mercaptan Odorant Tank, pressure tank	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	D-3905 A/B Anhydrous Ammonia Drums	N/A	N/A		Exempt
None	LPG Truck Loading Rack	N/A	N/A		Exempt (Regulation 2-1-123.3.1)
None	Octane Test Engines	N/A	N/A		Exempt
None	Post-BIOX Selenium Removal Facilities	N/A	N/A		Exempt
None	TK-2700 Fresh Caustic Tank	N/A	N/A		Exempt (Regulation 2-1-123.2)
None	Nitrogen Plant	N/A	N/A		Exempt
None	Assorted Organic Liquid Storage Vessels and Containers Less Than 260 gallons	N/A	N/A		Exempt (Regulation 2-1-

II. Equipment

Table II B - Exempt Sources

Each of the following sources has been issued an exemption pursuant to the provisions of BAAQMD Regulation 2, Rule 1.

S-#	Description	Make or Type	Model	Capacity	Throughput
					123.1)
None	Assorted Tanks, Vessels, and Pumping Equipment Associated with Aqueous Solutions	N/A	N/A		Exempt (Regulation 2-1-123.2)
None	Assorted Containers, Tanks, Reservoirs and Loading Equipment Associated with Heavy and/or Low Volatility Organic Liquids	N/A	N/A		Exempt (Regulation 2-1-123.3.2)
None	TK-2710 Fresh Acid Tank, 98% Sulfuric Acid	N/A	N/A		Exempt (Regulation 2-1-123.2.)
None	Cogeneration Plant Cooling Tower	N/A	N/A		Exempt (Regulation 2-1-128.4)

ATTACHMENT F-1

Derivation of Technology-Based Effluent Limits
Valero Benicia Refinery

References

1. 40 C.F.R. section 419, subpart B – Cracking Subcategory, *Effluent Limitation Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category* (2006)

2. *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category,* EPA/4401-82/014 (1982)

3. *Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry,* U.S. EPA Office of Water Regulations and Standards (1985)

4. Valero Refining Company-California, *Application for Renewal, NPDES Permit No. CA0005550* (June 26, 2014)

5. Refinery Production Data, January 2010-July 2014, from *Application for Renewal, NPDES Permit No. CA0005550*. Attachment 2C-IIIC – Basis for Reporting Production Rates

Applicable Definitions

Process Wastewater means any water, which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. [40 C.F.R. § 401.11(q)]

Runoff means the flow of stormwater resulting from precipitation coming into contact with petroleum refinery property. [40 C.F.R. § 419.11(b)]

Contaminated Runoff means runoff that comes into contact with any raw material, intermediate product, finished product, by-product, or waste product located on petroleum refinery property. [40 C.F.R. § 419.11(g)]

Background

Effluent Limitations Guidelines (ELGs) for the Cracking Subcategory of the Petroleum Refining Point Source Category at 40 C.F.R. section 419, subpart B, are based, in part, on a discharger's production rate. The Discharger's current production rate is 140,100 barrels per day (bbls/d).

<u>Process Wastewaters.</u> The ELGs include limits for process wastewaters based on best practicable control technology currently available (BPT), best available technology economically achievable (BAT), and best conventional pollutant control technology (BCT). Specific BPT, BAT, and BCT effluent limits that apply to the Discharger must be derived using methods described by the ELGs and take into account such factors as production rate, as well as refinery processes and configuration. The most stringent of BPT, BAT, and BCT limits apply.

To derive BPT, BAT, and BCT limits for process wastewaters discharged at Discharge Point No. 001, size factors and process factors are determined as follows:

Size Factor. At a crude processing rate of 141,100 bbls/day, the appropriate size factor is 1.35 based on the ELGs at 40 C.F.R. section 419.22(b)(1) for BPT, 40 C.F.R. section 419.23(b)(1) for BAT, and 40 C.F.R. section 419.24(b)(1) for BCT.

Process Factor. The process configuration for each process is determined by summing the process feedstock rates for each crude, cracking and coking, lube, and asphalt process at the refinery. Each individual feedstock rate is multiplied by the capacity relative to the throughput and a weight factor specific for each process to derive a "process configuration," which in turn is used to determine a "process factor" in accordance with the ELGs at 40 C.F.R. section 419.22(b)(2) for BPT, 40 C.F.R. section 419.23(b)(2) for BAT, and 40 C.F.R. section 419.24(b)(2) for BCT.

Processes considered in deriving the process factors are those (as reported by the Discharger) within the crude and cracking and coking categories, which correspond to the process groups listed within the *Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry* (page 19). The Discharger does not have lube processes, so this process group is not considered in determining the process factors.

Derivation of the process configuration for a production rate of 140,100 bbls/day is shown in the following table:

Table F-1A. Process Configurations for Discharge Point No. 001

Process	Process Feedstock Rate (x 1,000 bbls/day)	Process/Feedstock Ratio	Weighting Factor	Process Configuration
Crude				
Atmospheric Distillation	140.1	1		
Vacuum Crude Distillation	73.8	0.53		
Desalting	140.4	1		
Total	354.3	2.53	1	2.53
Cracking				
Fluid Catalytic Cracking	69.7	0.50		
Hydrocracking	29.3	0.21		
Hydrotreating	32.5	0.23		
Total	131.5	0.94	6	5.63
Asphalt				
	15.5	0.11	12	1.33
Total Refinery Process Configuration				**9.49**

Based on the total refinery process configuration, the process factor is 1.82 pursuant to 40 C.F.R. section 419.22(b)(2) for BPT, 40 C.F.R. section 419.23(b)(2) for BAT, and 40 C.F.R. section 419.24(b)(2) for BCT.

To determine BAT limits for total and hexavalent chromium and phenolic compounds in process wastewaters, the ELGs require consideration of effluent factors and refinery processes. BAT effluent factors are presented at 40 C.F.R. section 419.23(c)(1); the refinery processes considered are the crude, cracking and coking, and reforming and alkylation processes, which correspond to those identified within the *Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry* (page 20).

Contaminated Runoff. The ELGs establish BPT, BAT, and BCT limits for contaminated runoff applicable to all stormwater discharges, except stormwater treated and discharged with process wastewaters through Discharge Point No. 001. The ELGs establish effluent limits for oil and grease and total organic carbon (TOC). If the oil and grease or TOC limits are exceeded, 40 C.F.R. sections 419.22(e)(2) and 419.23(f)(2) set forth additional limits for biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), phenolic compounds, pH, and hexavalent and total chromium.

In general, BPT limits are the most comprehensive and stringent of the applicable technology-based limits for contaminated runoff and, therefore, are incorporated into this Order as additional effluent limits for discharges of contaminated runoff where oil and grease or TOC limits are exceeded. The following table summarizes the applicable technology-based effluent limits based on the ELGs for contaminated runoff.

Table F-1B. Contaminated Runoff Technology-Based Limits

Pollutant	Effluent Limit[1]	
	Max Daily (mg/L)	30-day Average (mg/L)
Oil and Grease	15	---
TOC	110	---
If either limit above is exceeded, all limits below become effective.		
5-day biochemical oxygen demand (BOD_5)	48	26
TSS	34	22
COD	360	180
Oil & Grease	15.6	8.0
Phenolic Compounds (4AAP)	0.35	0.17
Total Chromium	0.60	0.22
Chromium (VI)	0.062	0.028
pH	6.0-9.0 [2]	

[1] All effluent limits reflect BPT requirements from 40 C.F.R § 419, subpart B, except those for total chromium, which reflect BAT requirements.

[2] The pH limits are to be instantaneous.

This Order establishes effluent limits for oil and grease and TOC for all discharge points where contaminated runoff is discharged. Effluent limits for BOD_5, TSS, COD, phenolic compounds, and chromium become effective immediately upon an exceedance of oil and grease or TOC limits for the outfall where the exceedance occurred. The pH effluent limit listed in the table above is less stringent than the applicable water quality objectives for pH; therefore, this Order retains the more stringent, water quality-based pH limit of 6.5 to 8.5 from the previous order, consistent with Basin Plan section 3.3.9 and Table 4-2 (for shallow-water discharges).

Determination of Process Wastewater Effluent Limits at Discharge Point No. 001

BPT. The following table shows the derivation of process wastewater BPT limits at a production rate of 140,100 bbls/day feedstock:

Table F-1C. BPT Limits for Process Wastewaters

	Preliminary Effluent Limit Factor (pounds/1,000 bbls feedstock)[1]		Size Factor	Process Factor	Feed Stock Rate	Effluent Limits (pounds/day)	
	Max Daily	Avg Monthly				Max Daily	Avg Monthly
BOD_5	9.9	5.5	1.35	1.82	140.1	3,400	1,900
TSS	6.9	4.4	1.35	1.82	140.1	2,400	1,500
COD	74.0	38.4	1.35	1.82	140.1	25,000	13,000
Oil and Grease	3.0	1.6	1.35	1.82	140.1	1,000	550
Phenolic Compounds (4AAP)	0.074	0.36	1.35	1.82	140.1	25	120
Total Ammonia, as N	6.6	3.0	1.35	1.82	140.1	2,300	1,000
Sulfide	0.065	0.029	1.35	1.82	140.1	22	10
Total Chromium	0.15	0.088	1.35	1.82	140.1	52	30
Chromium (VI)	0.012	0.0056	1.35	1.82	140.1	4	2
pH	--	--	--	--	--	6.0 – 9.0 [2]	

[1] From 40 C.F.R. § 419.22(a)
[2] The pH limits are to be instantaneous.

BAT. The following table shows the derivation of BAT limits for process wastewaters at a production rate of 140,100 bbls/day feedstock:

Table F-1D. BAT Limits for Process Wastewater

	Preliminary Effluent Limit Factor (pounds/1,000 bbls feedstock)[1]		Size Factor	Process Factor	Feed Stock Rate	Effluent Limits (pounds/day)	
	Max Daily	Avg Monthly				Max Daily	Avg Monthly
Production at 140,100 bbls/day							
COD [2]	74.0	38.4	1.04	2.26	140.1	24,000	13,000
Total Ammonia, as N	6.6	3.0	1.04	2.26	140.1	2,200	1,000
Sulfide	0.065	0.029	1.04	2.26	140.1	21	10

[1] From 40 C.F.R. § 419.22(a)
[2] In any case in which the applicant can demonstrate that the chloride concentration in the effluent exceeds 1,000 mg/L (1,000 ppm), TOC may be substituted in lieu of COD. TOC effluent limits must be based on effluent data correlating TOC to BOD_5.

BAT limits for total and hexavalent chromium and phenolic compounds are based on the following feedstock rates, which are based on a total production rate of 140,100 bbls/day feedstock:

Table F-1E. Feedstock Rates for Determining BAT Limits

	Feedstock Rate (bbls/day)
Crude	
Atmospheric Distillation	140.1
Vacuum Distillation	73.8
Desalter	140.4
Total	**354.3**

	Feedstock Rate (bbls/day)
Cracking and Coking	
Fluid Cat Cracking	69.7
Fluid Coking	29.3
Hydrocracking	32.5
Cat Feed Hydrofiner	36.6
Virgin Naptha Hydrofiner	28.3
Jet Hydrofiner	13.7
Heavy Cat Naptha Hydrofiner	16.8
Diene Hydrofiner	22.2
Light Cat Naptha Hydrofiner	20.4
Hardcut Saturation Unit	9.0
Ultra Low Sulfur Diesel	19.9
Total	**298.4**
Asphalt	
Total	**15.5**
Reforming and Alkylation[1]	
Reforming	29.0
Alkylation	22.2
Total	**51.2**

[1] Although the Discahrger reported dimersol as a "Reforming and Alkylation" process, it was not considered such a process for purposes of these calculations.

Based on the total feedstock rates shown above, derivation of BAT limits for total and hexavalent chromium and phenolic compounds is shown in the following table:

Table F-1F. BAT Limits for Process Wastewater (Chromium and Phenolic Compounds)

Pollutant	Preliminary Effluent Limits Factor (pounds/1,000 bbls feedstock)[1]		Feedstock Rate	Effluent Limits (pounds/day)	
	Max Daily	Avg Monthly		Max Daily	Avg Monthly
Phenolic Compounds					
Crude	0.013	0.003	354.30	4.61	1.06
Cracking and Coking	0.147	0.036	298.40	43.86	10.74
Asphalt	0.079	0.019	15.50	1.22	0.29
Lube	0.369	0.090	0.00	0.00	0.00
Reforming and Alkylation	0.132	0.032	51.20	6.76	1.64
Limit (Sum)	---	---	---	**56.45**	**13.74**
Total Chromium					
Crude	0.011	0.004	354.30	3.90	1.42
Cracking and Coking	0.119	0.041	298.40	35.51	12.23
Asphalt	0.064	0.022	15.50	0.99	0.34
Lube	0.299	0.104	0.00	0.00	0.00
Reforming and Alkylation	0.107	0.037	51.20	5.48	1.89
Limit (Sum)	---	---	---	**45.88**	**15.89**
Hexavalent Chromium					
Crude	0.0007	0.0003	354.30	0.25	0.11

Pollutant	Preliminary Effluent Limits Factor (pounds/1,000 bbls feedstock)[1]		Feedstock Rate	Effluent Limits (pounds/day)	
	Max Daily	Avg Monthly		Max Daily	Avg Monthly
Cracking and Coking	0.0076	0.0034	298.40	2.27	1.01
Asphalt	0.0041	0.0019	15.50	0.06	0.03
Lube	0.0192	0.0087	0.00	0.00	0.00
Reforming and Alkylation	0.0069	0.0031	51.20	0.35	0.16
Limit (Sum)	---	---	---	**2.93**	**1.31**

[1] From 40 C.F.R. § 419.22(a)

BCT. The following table shows the derivation of BCT limits for process wastewaters at a production rate of 140,100 bbls/day feedstock:

Table F-1G. BCT Limits for Process Wastewater

Pollutant	Preliminary Effluent Limits Factor (pounds/1,000 bbls feedstock)[1]		Size Factor	Process Factor	Feed Stock Rate	Final Effluent Limits (pounds/day)	
	Max Daily	Avg Monthly				Max Daily	Avg Monthly
BOD_5	9.9	5.5	1.35	1.82	140.1	3,400	1,900
TSS	6.9	4.4	1.35	1.82	140.1	2,400	1,500
Oil and Grease	3.0	1.6	1.35	1.82	140.1	1,000	550
pH	--	--	--	--	--	6.0 – 9.0 [2]	

[1] From 40 C.F.R. § 419.22(a)
[2] The pH limits are to be instantaneous.

Most Stringent Technology-Based Process Wastewater Effluent Limits

The following table presents the technology-based effluent limits for the Facility's process wastewater. The limits are the most stringent of the BPT, BAT, and BCT limits calculated above:

Table F-1H. Summary of Technology-Based Process Wastewater Effluent Limits

	Effluent Limits (pounds/day)[1]	
Pollutant	**Max Daily**	**Avg Monthly**
BOD_5	3,400	1,900
TSS	2,400	1,500
COD	24,000	13,000
Oil and Grease	1,000	550
Phenolic Compounds (4AAP)	25	14[2]
Total Ammonia, as N	2,200	1,000
Sulfide	21	10
Total Chromium	46[2]	16[2]
Chromium (VI)	2.9[2]	1.3[2]
pH	6.0 – 9.0 [3]	

[1] All limits are based on BPT unless otherwise noted.
[2] Limit is based on BAT.
[3] The pH limits are to be instantaneous.

Attachment KR–7

U.S. Energy Information Administration, 2015. *PADD 5 Transportation Fuels Markets;* September 2015. U.S. Department of Energy: Washington, DC. (Previously submitted at the Planning Commission Hearing.)

Independent Statistics & Analysis
U.S. Energy Information Administration

PADD 5 Transportation Fuels Markets

September 2015

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U.S. Department of Energy
Washington, DC 20585

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Introduction

This study examines supply, demand, and distribution of transportation fuels in Petroleum Administration for Defense District (PADD) 5, a region that includes the western states of California, Arizona, Nevada, Oregon, Washington, Alaska, and Hawaii. For this study, transportation fuels include gasoline, diesel fuel, and jet fuel.

This study is the first in a series of studies that the U.S. Energy Information Administration (EIA) plans to conduct to inform its analyses of petroleum product markets, especially during periods of supply disruption and market change.

Figure 1. Petroleum Administration for Defense Districts (PADDs)

Source: U.S. Energy Information Administration

This study examines transportation fuels supply, demand, and distribution at both the PADD level and for specific areas within the PADD, which are referred to as sub-PADD regions in this analysis. PADD 5 covers a large and diverse geography, and supply/demand balances and supply patterns vary within the region. The study identified six distinct regional markets within PADD 5: Southern California and Southern Nevada; Northern California and Northern Nevada; Pacific Northwest, which includes Washington and Oregon; Arizona; Hawaii; and Alaska.

For each of these regional markets as well as for PADD 5 as a whole, the study considers demand, supply, supply patterns, and distribution infrastructure, using 2013 as a base year and taking into account expected changes in balances and infrastructure in subsequent years. Demand includes in-region consumption, transfers of fuels to other parts of the United States (other PADDs) and to other regional markets within PADD 5, and exports to the global market. Supply includes in-region refinery production, receipts of fuels produced in other U.S. regions and other PADD 5 regional markets, and imports. Distribution infrastructure includes storage terminals, pipelines, rail facilities, marine loading and unloading facilities, and marine vessel availability.

EIA retained Stillwater Associates, an Irvine, California-based transportation fuels consultant, to conduct the research and analysis for the PADD 5 study. Stillwater analyzed data and information from EIA, the California Energy Commission (CEC), the Army Corps of Engineers Waterborne Commerce Statistics Center, and publicly available data from various sources.

Additional studies are planned to analyze PADD 5 crude supply, PADD 1 (East Coast), and PADD 3 (Gulf Coast) transportation fuels markets, and PADD 2 (Midwest) and PADD 4 (Rocky Mountains) transportation fuels markets.

Executive Summary

In 2013, PADD 5 accounted for 17%, or 1.5 million barrels/day (b/d), of total U.S. gasoline consumption, 13%, or 494,000 b/d, of distillate (including diesel fuel) consumption, and about 30%, or 430,000 b/d, of jet fuel consumption. Consumption varies across PADD 5 and is concentrated in California.

PADD 5 transportation fuels markets have features that often result in significant and persistent increases in prices in the wake of supply disruptions. The region is geographically isolated from other U.S. refining centers, notably the Gulf Coast, where 52% of U.S. refining capacity is located, and from global refining centers that can efficiently supply product to the U.S. East Coast (PADD 1). In addition, although pipelines can move products from the Gulf Coast as far north as New York Harbor on the East Coast, there are no pipelines that cross the Rocky Mountains to move product to the mainland states of PADD 5 from the Midwest, and only limited pipelines that deliver from the Gulf Coast to the southern regions of PADD 5 and from the small refineries in PADD 4 to the eastern regions of PADD 5. The West Coast is 10 days travel by tanker from the U.S. Gulf Coast, three weeks from Asia, and more than four weeks from Europe. Pipeline and marine infrastructure, as well as vessel availability to move product within PADD 5, are also limited.

Across PADD 5, specifications for motor gasoline and diesel fuel vary state-to-state and even within some states, making it difficult to cover product shortfall in one area with supply from another. In addition, some product specifications, like those for the California Air Resources Board (CARB) gasoline and diesel fuel, are difficult and costly to manufacture, and not all refineries in PADD 5, much less elsewhere in the United States or the rest of the world, can make such products. Even when refineries outside PADD 5 can manufacture product to meet these specifications, supplies generally are not kept on hand, further limiting resupply options when disruptions occur.

Because PADD 5 is isolated, in-region refineries are the primary source of transportation fuels for PADD 5. In 2013, PADD 5 refinery production was sufficient to cover about 91% of in-region motor gasoline demand, 96% of jet demand, and 113% of distillate demand. Heavy reliance on in-region production further complicates the supply chain when disruptions occur. When disruptions occur, all of these factors noted above combine to limit short-term supply options, lengthen the duration of supply disruptions, and cause prices to increase and remain higher for a longer period than would be typical in markets outside PADD 5.

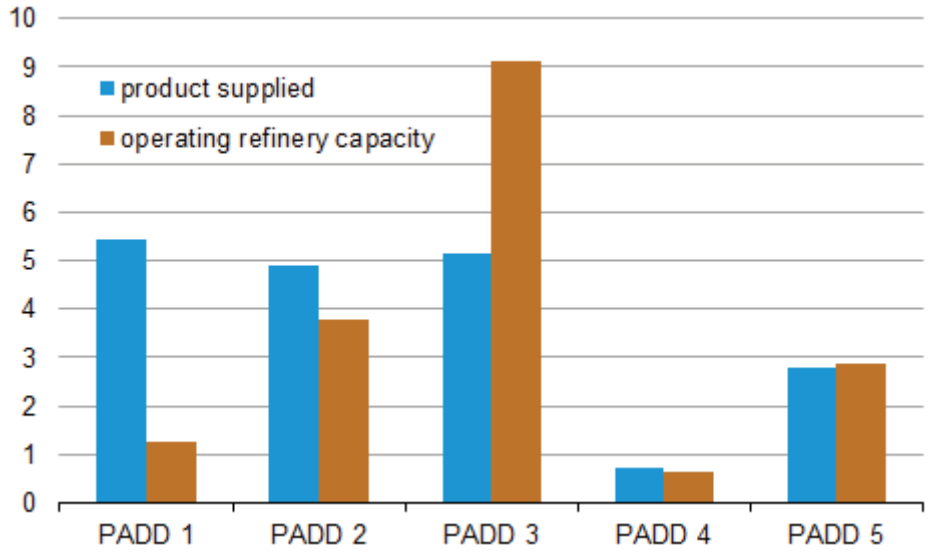
The recent increase in gasoline prices on the West Coast following a series of supply disruptions that started with an unplanned refinery outage in February at a Southern California refinery provides a case in point. On February 18, an explosion and fire occurred at the third-largest refinery in Southern California. West Coast product markets reacted immediately to the potential loss of supply from the refinery, and spot gasoline prices quickly increased. The rapid price response is not unusual and is similar to what happened following past unplanned outages in that region. In the five weeks following the outage, West Coast total motor gasoline inventories decreased by 3.0 million barrels (10%), and remained below the five-year average for most weeks through August. Inventories provide an immediate, although limited, source of alternative supply but typically are insufficient to offset a prolonged market disruption. With limited resupply options from within the region and from within the

United States, imports increased to replace in-region production. Because the refinery outage has not yet been resolved as of the writing of this report, PADD 5 has continued to rely on imports, which has lengthened the supply chain, making the region more susceptible to shipping delays and other supply chain disruptions. Gasoline prices on the West Coast increased sharply again in early July when, according to trade press, shipping delays caused gasoline cargoes destined for the West Coast to arrive later than anticipated. In addition, PADD 5 gasoline demand was up 4% in the first six months of 2015 compared with the same time last year, putting additional pressure on the supply chain.

There are 22 operating refineries in Washington, Oregon, California, Nevada, and Arizona, the mainland states of PADD 5. These refineries, which have total atmospheric distillation unit (ADU) capacity of 2.5 million barrels per calendar day (b/cd), are located primarily in and around Los Angeles and San Francisco, California, and Puget Sound in Washington. There are two operating refineries in Hawaii with combined crude distillation processing capacity of 147,500 b/cd and five operating refineries in Alaska with combined crude distillation capacity of 165,200 b/cd.

Figure 2. Petroleum product supply and refining capacity by PADD

million barrels per day



Note: Refinery capacity is in barrels per calendar day.
Source: U.S. Energy Information Administration

This study identified six distinct sub-PADD regional markets within PADD 5, each of which is characterized by different supply patterns for transportation fuels and each of which interacts differently with the other regions within PADD 5 and the global markets. The six regions are:

- Southern California and Southern Nevada
- Northern California and Northern Nevada
- Arizona
- Pacific Northwest, which includes Washington and Oregon
- Alaska
- Hawaii

PADD 5 is just not one market for transportation fuels, but rather six distinct regional markets. These six regional markets vary significantly in demand, how transportation fuels are supplied, especially the share of supply provided by in-region refineries, and product distribution patterns. Because there is limited pipeline infrastructure connecting the six regional markets, marine movements within PADD 5 play a key role in moving transportation fuels from regions with excess supply to regions with supply shortfalls. As a result, marine vessels are generally highly utilized, and there is minimal capacity to increase intraregional shipments to manage supply disruptions.

Figure 3. PADD 5 marine movements

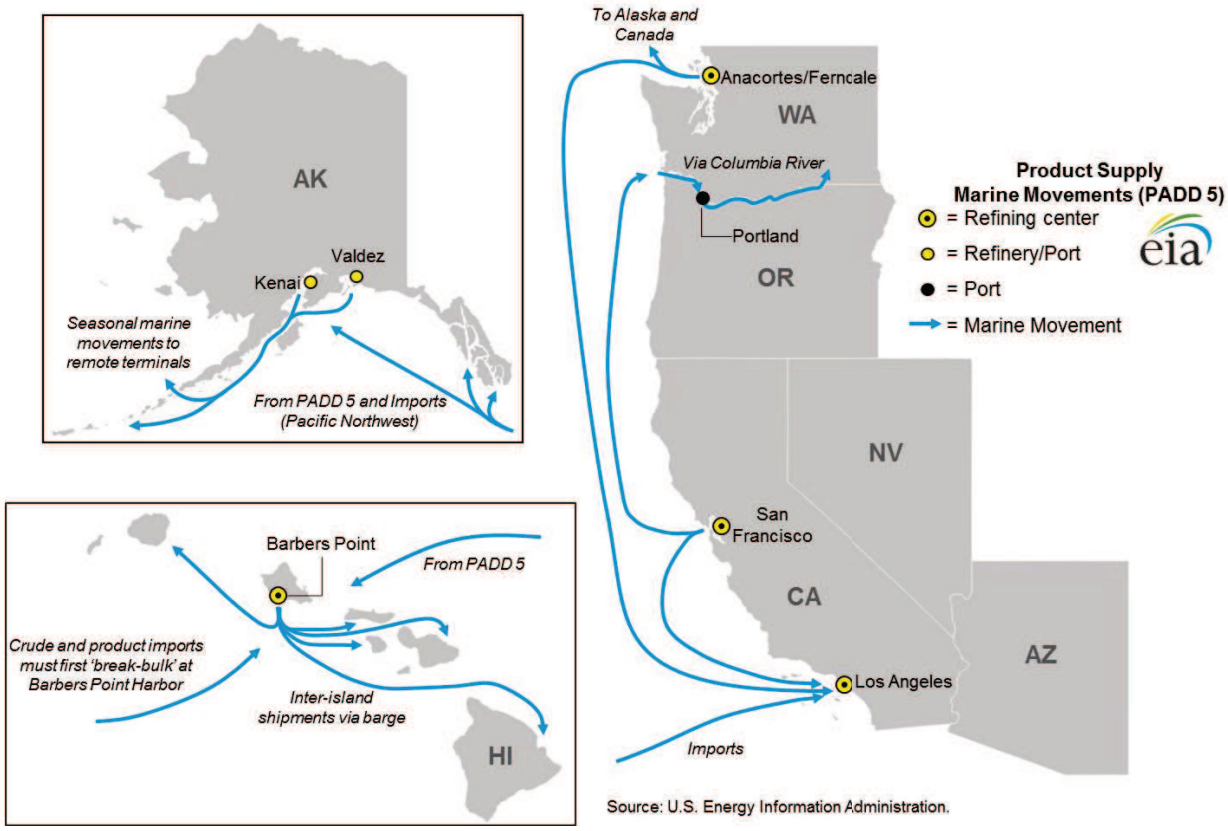
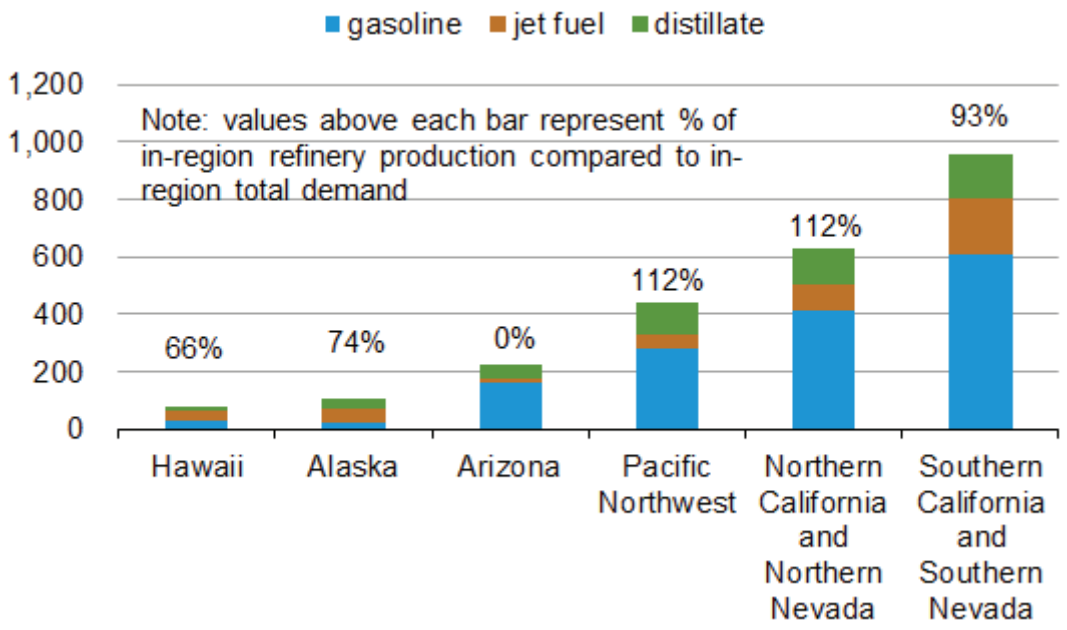


Figure 4. PADD 5 2013 average regional transportation fuel demand by product

thousand barrels per day



Source: Stillwater Associates analysis of EIA data

Southern California and Southern Nevada

The Southern California and Southern Nevada (SCSN) region includes the southernmost counties of California[1] as well as the Las Vegas metropolitan area of Southern Nevada. The region accounts for more than 40% of total PADD 5 motor gasoline demand, and about 7% of total U.S. demand. Because of the many military air bases and large commercial aviation hubs, jet fuel demand in the SCSN region accounts for about 45% of total PADD 5 jet fuel demand and 14% of U.S. demand. SCSN accounts for 32% of total PADD 5 distillate fuel demand, which is about 4% of U.S. demand.

A combination of in-region refinery production, marine-delivered fuels produced at refineries in Northern California and Washington, receipts of fuels produced at refineries in other PADDs, and imports from the global market supply the SCSN region with transportation fuels. The regional refineries do not produce sufficient gasoline or jet fuel to meet in-region demand but produce more distillate than is consumed in the region. In-region refinery production is supplemented with marine deliveries of product from refineries in Northern California and Washington as well as imports from the global market. Transportation fuels produced at SCSN refineries also supply Arizona, and some are exported into the global market. Exports are primarily distillate fuel, which might not meet region specifications.

There are eight operating refineries in the Southern California and Southern Nevada region. In 2013, SCSN refineries produced a total of 526,800 b/d of gasoline, 182,500 b/d of distillate, and 178,100 b/d of

[1] The southernmost counties of California are Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.

jet fuel, production sufficient to supply 87% of regional motor gasoline demand, 117% of total distillate fuel demand, and 92% of jet fuel demand.

Production from the refineries moves primarily by pipeline from the Los Angeles area to bulk storage and distribution terminals throughout the SCSN region. From terminals, product moves by tank truck to retail outlets. Product from the Los Angeles area is also shipped by pipeline to Arizona, reducing the product available to supply SCSN demand, which is particularly important for gasoline. Transportation fuels produced at refineries in Salt Lake City, Utah, in PADD 4, also supply SCSN.

Refineries, pipelines, ports, and storage facilities are all critical to the effective functioning of the petroleum supply chain. However, in the SCSN region, Watson Station, a pipeline hub in Carson, California, is particularly important. Product from many of the region's refineries must move through Watson Station to reach bulk storage and distribution facilities. Power outages and earthquakes can affect the region's infrastructure.

There are about 27 distinct branded companies participating in the retail market for gasoline and distillate fuel in the Southern California and Southern Nevada region. About 76% of retail outlets are branded, meaning that they are associated with and display a major oil company brand, like Chevron, Shell, 76, Valero, and ARCO. The remaining 24% of retail outlets are referred to as unbranded because they are not affiliated with a major oil company brand. Unbranded retailers include small independent retailers as well as big box retailers. In California as a whole, 79% of retail outlets are associated with a major brand, while 21% are unbranded.

Northern California and Northern Nevada

The Northern California and Northern Nevada region (NCNN) includes counties in California north of San Luis Obispo, Kern, and San Bernardino counties, and in Nevada north of Las Vegas. In 2013, with average motor gasoline demand of 412,000 b/d, the region accounted for 27% of total PADD 5 motor gasoline demand and 5% of U.S. motor gasoline demand. NCNN distillate demand of 125,000 b/d in 2013 accounted for 25% of PADD 5 demand and 3% of U.S. demand. NCNN jet fuel demand averaged 88,000 b/d in 2013, 21% of PADD 5 demand and 6% of U.S. demand.

The region is supplied by in-region refinery production, and refineries in the region produce more motor gasoline, jet fuel, and diesel fuel than is consumed in the region. As a result, NCNN supplies other regional markets in PADD 5, primarily Southern California and Southern Nevada, with motor gasoline, jet fuel, and diesel fuel, and also exports these products. In 2013, the region exported 22,100 b/d of gasoline, 2,300 b/d of jet fuel, and 52,400 b/d of distillate fuel, primarily to Central America and South America.

There are nine operating refineries in two primary refining centers in the Northern California and Northern Nevada region. Only one of the refineries is located outside California, and it primarily produces asphalt. Most of the California refining capacity in the NCNN region is in the San Francisco Bay area. Several smaller refineries are located in California's Central Valley.

In 2013, NCNN refineries produced an average of 421,000 b/d of motor gasoline and motor gasoline blending components, 185,000 b/d of distillate, and 96,000 b/d of jet fuel. This production was more

than sufficient to meet in-region demand. NCNN refineries produced product sufficient to meet 102% of regional demand for finished motor gasoline,[2] 108% of jet fuel demand, and 147% of diesel fuel demand. Production from refineries in Northern California regularly supplies parts of Southern California and Oregon by marine vessel.

Product is shipped by pipeline from the refineries in San Francisco to storage and distribution terminals in the San Francisco area and further inland to Fresno and Chico, California, and to Nevada. No pipelines connect the NCNN region to other PADDs or other PADD 5 regional markets, and, as a result, supply from NCNN to those areas moves by marine vessel. The major port facilities through which products are exported into the global market and from which products are shipped to other PADD 5 regional markets are located on the San Francisco Bay.

Critical supply chain infrastructure includes the refineries, pipelines, ports, and storage facilities of the San Francisco Bay area. In particular, the Concord pipeline junction is the gathering and entry point for the main pipeline distribution artery for the region. Power outages and earthquakes can affect the region's infrastructure, and heavy fog can disrupt the port facilities on the San Francisco Bay.

In the Northern California/Northern Nevada region, 80% of retail outlets are branded and 20% are unbranded. In Northern California, about 21 companies participate in the retail market for gasoline and diesel fuel as compared with about 12 in the Reno/Carson City market. In Northern California, major oil company branded outlets dominate the retail sector, and the top five brands have 76% of the number of retail outlets. A mix of branded and unbranded retail outlets characterizes the Reno/Carson City market.

Pacific Northwest

The Pacific Northwest region (PNW) includes the states of Oregon and Washington. In 2013, with 277,300 b/d of motor gasoline demand, the region accounted for 18% of total PADD 5 motor gasoline demand and 3% of total U.S. demand. At 111,400 b/d, PNW demand for distillate fuel was 23% of PADD 5 demand and 3% of U.S. demand. Jet fuel demand in the Pacific Northwest averaged 51,400 b/d in 2013, 12% of PADD 5 demand and 4% of U.S. demand.

The region is supplied by a combination of in-region refinery production, imports, and receipts of product manufactured at refineries outside PADD 5. Refineries in the PNW produce about as much gasoline as is consumed in the region, but considerably more than enough distillate and jet fuel than is needed to meet in-region demand. The region supplies distillate fuel and jet fuel to the global market and to other regions within PADD 5 and exports motor gasoline. The PNW also imports motor gasoline and a small amount of distillate. The combination of imports and exports is used to manage distribution system inefficiencies and gasoline grade imbalances. The PNW typically does not receive product from other regions within PADD 5. In 2013, the region exported 26,000 b/d of motor gasoline, 26,800 b/d of jet fuel, and 43,200 b/d of distillate fuel, primarily to Canada, Mexico, Central America, and South America.

There are five operating refineries in the Pacific Northwest region, located in and around Puget Sound, Washington. There are no refineries in Oregon or eastern Washington.

[2] Finished motor gasoline includes gasoline blendstock produced by refineries and 10% ethanol.

In 2013, PNW refineries produced an average of 253,400 b/d of motor gasoline and motor gasoline blending components, 154,100 b/d of distillate fuel, and 83,600 b/d of jet fuel. This production was sufficient to meet 102% of regional demand for motor gasoline, 163% of jet fuel demand, and 140% of diesel fuel demand. Production from refineries in Washington regularly supplies Alaska and California.

Product is shipped from the refineries by pipeline north and south to supply Portland, Oregon, and Seattle, Washington, and product is shipped by marine vessel to supply the global markets and other regions within PADD 5. Many of the Portland storage and distribution terminals have access to the Columbia River and can ship and receive product by marine vessel. Each of the five refineries also has associated dock infrastructure for loading and discharging marine vessels, which supports imports and exports of petroleum products.

Product moves from storage and distribution terminals in Portland south to Eugene, Oregon by pipeline. Distribution infrastructure to move product from the western portions of Washington and Oregon eastward is limited. The only connection between the western and eastern portions of the region is marine transport along the Columbia River. There is no pipeline infrastructure to move product across the Cascade Range of mountains. As a result, eastern Washington is supplied with product from refineries in PADD 4. Product moves by pipeline from Salt Lake City, Utah, into eastern Washington and Oregon, and from refineries in Billings, Montana, into eastern Washington.

Critical infrastructure in the region includes the refinery complexes, pipelines, storage and distribution terminals, and the marine facilities at refineries and terminals, notably those along the Columbia River. Weather can disrupt the region's marine facilities. The Olympic pipeline, which runs from Puget Sound, Washington, to Portland, Oregon, is the main north-south corridor for petroleum product transportation in the region. Disruptions to flows on the Olympic pipeline can have a major effect on regional supply. Many of the storage and distribution terminals connected to the pipeline lack other supply options. As a result, during supply disruptions product typically supplied from these terminals may need to be sourced from other terminals, which can increase supply costs and therefore prices.

The Pacific Northwest has a slightly higher percentage of branded outlets compared to PADD 5 overall. The region has about 25 branded retailers, with 77% of retail stations selling branded fuels compared to the PADD 5 average of 72%. Brands in the Pacific Northwest include Chevron, Shell, 76, Conoco, and ARCO along with Pilot, Costco, and Sam's Club.

Arizona

Arizona accounts for 11% of PADD 5 demand for motor gasoline, 3% of demand for jet fuel, and 10% of distillate fuel demand. There are no petroleum refineries in Arizona, and the region is supplied with product by pipelines that originate in Southern California and West Texas. In 2013, the region consumed 161,500 b/d of motor gasoline, 14,600 b/d of jet fuel, and 50,600 b/d of distillate fuel.

The Kinder Morgan East Line originates in El Paso, Texas, and consists of two parallel pipelines that end in Phoenix, Arizona. Refineries in West Texas and New Mexico supply product into the East Line for delivery to four storage and distribution terminals in Phoenix and two in Tucson, Arizona. The Kinder Morgan West Line runs from Watson in the Los Angeles Basin to Phoenix, Arizona, and delivers product into storage and distribution terminals in Phoenix.

The two pipelines of the East Line operate at very close to full capacity, while the West Line operates well below its capacity, and as a result, is a source of incremental supply for Phoenix should supply from the East Line be reduced. However, as the transportation time for fuels delivered into Phoenix from Los Angeles is about a week to 10 days, incremental supply to Phoenix will not be immediately available. Fuels cannot be delivered from Phoenix to Tucson by pipeline; thus, there is no backup pipeline capacity for fuels supply into Tucson. Incremental supply to Tucson is via long-haul trucking.

The Kinder Morgan East and West Lines are critical to fuels supply to Arizona. Train derailments, as well as washouts and pipeline ruptures, have affected the pipeline, sections of which lie in the Union Pacific Railroad right of way. Most disruptions have been of short duration.

There are about 23 distinct fuels retailers operating in Arizona, and most (56%) of the retail outlets are unbranded. Major retail brands in Arizona include Chevron, Circle K, Fry's, QuikTrip, Shell, and Valero.

Hawaii

Hawaii is remote and isolated from other PADD 5 regional markets and other PADDs, and relies primarily on in-region refinery production and imports. In 2013, refineries in Hawaii produced 21,500 b/d of motor gasoline, 20,300 b/d of jet fuel, and 11,800 b/d of diesel fuel sufficient to meet 72% of motor gasoline demand, 55% of jet fuel demand, and 81% of distillate fuel demand. Refinery production was supplemented with motor gasoline imports of 5,400 b/d, jet fuel imports of 19,700 b/d, and distillate imports of 2,200 barrels per day. Hawaii was also supplied with small volumes of motor gasoline and diesel fuel from other PADDs and a small volume of diesel fuel from other PADD 5 regional markets.

The state's island geography supports air travel, and as a result Hawaii's jet fuel demand, which averaged 37,000 b/d in 2013, is higher than demand for both motor gasoline and diesel fuel. Hawaii's jet fuel demand accounted for 8% of PADD 5 demand in 2013, compared with 2% of motor gasoline and 3% of distillate fuel demand. The state's distillate demand is boosted by demand from the electric power sector and U.S. Navy demand for marine fuels.

There are two operating refineries in Hawaii, both on the island of Oahu. One of the two refineries was closed for part of 2013 and changed ownership. As a result, 2013 data on refinery transportation fuels supply are atypical for Hawaiian petroleum product markets.

In 2013, refineries in Hawaii produced 21,500 b/d of motor gasoline, 20,300 b/d of jet fuel, and 11,800 b/d of distillate fuel, sufficient to meet 72% of motor gasoline demand, 55% of jet fuel demand, and 81% of distillate fuel demand. Refinery production was supplemented with motor gasoline imports of 5,400 b/d, jet fuel imports of 19,700 b/d, and diesel imports of 2,200 b/d. Hawaii was also supplied with small volumes of motor gasoline and diesel fuel from other PADDs and a small volume of diesel fuel from other PADD 5 regional markets. In addition to transportation fuels, Hawaiian refineries produce significant quantities of heavy fuels used in electric power generation.

The two refineries on Oahu and the Barbers Point port facilities and associated barge fleet are critical to Hawaii. Product from the refineries on Oahu moves by pipeline to supply storage and distribution terminals on Oahu and moves by marine vessel from the Barbers Point Harbor to terminals on the islands of Maui, Kauai, and Hawaii. Product that arrives in Hawaii by marine vessel from imports and

other U.S. regions is also processed through the Barbers Point Harbor, where large seagoing marine vessels can be accommodated. Product is also shipped to the Honolulu International Airport by pipeline across Pearl Harbor, and jet fuel is delivered by truck from Honolulu area terminals. Large cargoes are offloaded, and smaller volumes are shipped by barge to the storage and distribution terminals on the other islands. There are 14 storage and distribution terminals outside the Honolulu area, many of which are very small.

There are about nine distinct retailers of transportation fuels in Hawaii, and 76% of retail outlets sell branded fuels. Chevron, 76, Aloha, Tesoro, and Shell are among the major retail brands in Hawaii.

Alaska

Alaska has the lowest population of all PADD 5 regions, and as a result, Alaska's demand for motor gasoline accounts for a small percentage of total PADD 5 demand. However, the region's remoteness and wide geographic expanse make air travel essential and make Alaska demand for jet fuel higher than for motor gasoline. PADD 5 diesel fuel demand is supported by resource extraction activities and oil production in the north. In 2013, Alaska demand for motor gasoline was 20,800 b/d, less than 2% of total PADD 5 demand; jet fuel demand was 48,400 b/d, 11% of PADD 5 demand; and diesel fuel demand was 33,400 b/d, 7% of PADD 5 demand.

The region is supplied primarily by in-region refinery production, production from refineries in other regions of PADD 5 that is delivered by marine vessel from Washington and California, and imports.

There are five operating refineries in Alaska. A sixth refinery, Flint Hills Resources North Pole refinery, closed in 2014 and is being dismantled and converted to a storage and distribution terminal. Tesoro operates the largest and most complex refinery in Alaska at Kenai. The Tesoro refinery produces a wider range of transportation fuels, including motor gasoline, jet fuel, and diesel fuel. The refinery also produces asphalt. The other operating refineries are dispersed across the state. On the North Slope, two of the three major crude oil producers operate small distillation-only refineries that produce arctic diesel fuel for production operations. The refineries inject unsold distillation products back into the Trans-Alaska Pipeline System (TAPS). Two other distillation-only refineries, one in North Pole in central Alaska and the other in Valdez in southern Alaska, also blend unsold distillation products back into TAPS.

On an annual average basis, the refineries in Alaska supply 83% of motor gasoline demand, 76% of jet fuel demand, and 66% of diesel fuel demand. However, Alaska's seasonal weather patterns result in seasonal differences in consumption, and supply/demand balances and supply patterns vary over the year. In-region refinery supply is supplemented with receipts from other PADD 5 regions and imports. Product is regularly supplied to southeastern Alaska by marine vessel from Washington and California. Alaska also exports a small amount of fuel to Canada and Asia.

Product is moved within Alaska by pipeline between Kenai and Anchorage, by rail between Anchorage and Fairbanks, and by marine vessel. The Anchorage-to-Fairbanks rail line and the pipeline to Anchorage are critical to the supply chain. Jet fuel is delivered to the Ted Stevens International Airport via both pipeline and trucks from Anchorage-area terminals.

There are 42 small storage/distribution terminals outside the Anchorage area that serve isolated areas. Deliveries to some locations are seasonal, occurring only during the summer and fall when barge movements are possible. In southeast Alaska, where there are few roads, fuels are supplied by barge from the U.S. West Coast and from Canada.

There are 9 distinct retailers with approximately 170 retail outlets in Alaska. Most of the retail locations (57%) are branded. Major retail brands include Holiday, Tesoro, Chevron, and Shell.

PADD 5 Overview

PADD 5 accounts for 17%, or 1.5 million barrels/day (b/d), of total U.S. gasoline consumption, 13%, or 494,000 b/d, of distillate (including diesel fuel) consumption, and about 30%, or 430,000 b/d, of jet fuel consumption. Consumption varies across the PADD and is concentrated in California (Table 1).

Table 1. Transportation fuels consumption within PADD 5: regional market breakdown

thousand barrels per day

	Gasoline[1]			Jet fuel			Diesel fuel		
Demand by region	**2013**	**% of PADD 5**	**% of U.S.**	**2013**	**% of PADD 5**	**% of U.S.**	**2013**	**% of PADD 5**	**% of U.S.**
Southern California/ Southern Nevada	606.6	40.2%	6.9%	194.1	44.8%	13.5%	155.5	31.7%	4.1%
Northern California/ Northern Nevada	412.0	27.3%	4.7%	88.2	20.3%	6.1%	125.6	25.6%	3.3%
Pacific Northwest	277.3	18.4%	3.1%	51.4	11.9%	3.6%	111.4	22.7%	2.9%
Arizona	161.5	10.7%	1.8%	14.6	3.4%	1.0%	50.6	10.3%	1.3%
Hawaii	29.6	2.0%	0.3%	36.7	8.5%	2.6%	14.6	3.0%	0.4%
Alaska	20.8	1.4%	0.2%	48.4	11.2%	3.4%	33.4	6.8%	0.9%
Total	**1,507.7**	**100%**	**17.0%**	**433.3**	**100.0%**	**30.2%**	**491.1**	**100.0%**	**12.8%**

[1]Finished motor gasoline, i.e., petroleum-based gasoline blendstock plus ethanol.
Source: U.S. Energy Information Administration

Transportation fuels supply

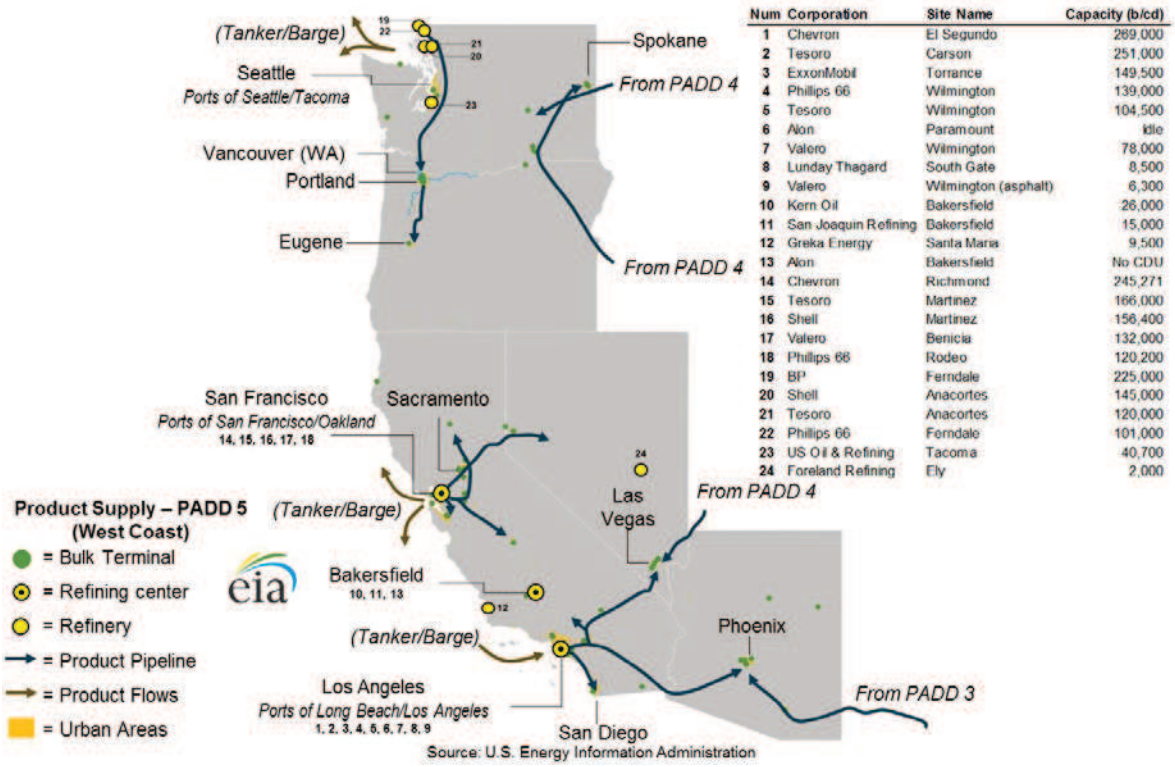
PADD 5 refineries are the primary source of transportation fuels for the region. There are 22 operating refineries in Washington, Oregon, California, Nevada, and Arizona, the mainland states of PADD 5. These refineries, which have total atmospheric crude distillation unit (ACDU) capacity of 2.5 million barrels per calendar day (b/cd), are located primarily in and around Los Angeles and San Francisco, California and Puget Sound in Washington State.

There are two operating refineries in Hawaii with combined crude distillation processing capacity of 147,500 b/cd and five operating refineries in Alaska with combined atmospheric crude distillation capacity of 165,200 b/cd.

PADD 5 depends largely on in-region refinery production of motor gasoline, jet fuel, and diesel fuel because of the relative geographic isolation of the region from other U.S. refining centers, like the Gulf Coast, and global refining centers, like Asia and Europe. There are no pipelines that cross the Rocky Mountains from PADD 4 (Rocky Mountains) and only limited pipelines that deliver to PADD 5 from PADD 3 (Gulf Coast). The West Coast is 10 days travel by tanker from the Gulf Coast and three weeks from Asia. In addition, much of PADD 5 requires the use of unique transportation fuels that are difficult and expensive to manufacture, notably California Air Resources Board (CARB) gasoline, and only a limited number of refineries outside PADD 5, both inside and outside the United States, can manufacture product that meets these unique specifications.

The interior markets of mainland PADD 5, which include Arizona, Las Vegas, Nevada, and eastern Washington, are less reliant on PADD 5 refineries as these markets can be supplied with transportation fuels produced at refineries in PADD 3 and PADD 4.

Figure 5. PADD 5 mainland refineries and product flows



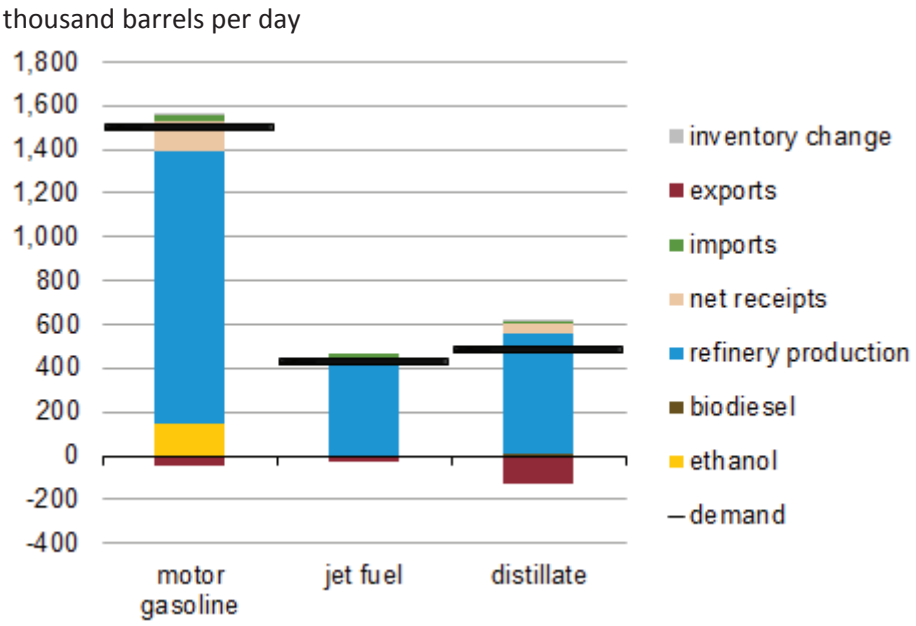
Num	Corporation	Site Name	Capacity (b/cd)
1	Chevron	El Segundo	269,000
2	Tesoro	Carson	251,000
3	ExxonMobil	Torrance	149,500
4	Phillips 66	Wilmington	139,000
5	Tesoro	Wilmington	104,500
6	Alon	Paramount	Idle
7	Valero	Wilmington	78,000
8	Lunday Thagard	South Gate	8,500
9	Valero	Wilmington (asphalt)	6,300
10	Kern Oil	Bakersfield	26,000
11	San Joaquin Refining	Bakersfield	15,000
12	Greka Energy	Santa Maria	9,500
13	Alon	Bakersfield	No CDU
14	Chevron	Richmond	245,271
15	Tesoro	Martinez	166,000
16	Shell	Martinez	156,400
17	Valero	Benicia	132,000
18	Phillips 66	Rodeo	120,200
19	BP	Ferndale	225,000
20	Shell	Anacortes	145,000
21	Tesoro	Anacortes	120,000
22	Phillips 66	Ferndale	101,000
23	US Oil & Refining	Tacoma	40,700
24	Foreland Refining	Ely	2,000

As a whole, PADD 5 refineries do not produce sufficient gasoline or jet fuel to meet total PADD 5 demand, but they produce more distillate than is consumed in the region. For 2013, PADD 5 refinery production of gasoline was sufficient to supply 91%[3] of PADD 5 demand, 96% of jet demand, and 113% of distillate demand. However, refinery production in two PADD 5 regional markets, Northern California/Northern Nevada and the Pacific Northwest, typically is sufficient to meet local demand under normal refinery operating conditions.

PADD 5 refinery production is supplemented by receipts of fuels produced at refineries in other PADDs and imports of petroleum products from the global market. Diesel fuel is exported to balance overall supply and demand, and other transportation fuels produced at PADD 5 refineries are also exported, to balance any mismatch between the quality of product that refineries can produce and the quality of product demanded, but also to manage distribution system inefficiencies. Distillate fuel makes up most exports, but some gasoline and jet fuel is also exported. Some exported product does not meet PADD 5 product specifications.

[3] 2013 PADD 5 demand for gasoline was 1,507.7 b/d of which about 90%, or 1,359.03.9 b/d, was petroleum-based gasoline blendstock (BOB). An additional 10% was ethanol. PADD 5 refineries produced 1,240.4 b/d petroleum-based gasoline, 90% of petroleum-based gasoline demand.

Figure 6. PADD 5 2013 supply/demand balance



Note: Net receipts are movements of product to and from other PADDs.
Source: Stillwater Associates analysis of EIA data

Product specifications

Gasoline and diesel specifications vary across PADD 5, complicating the supply chain and sometimes making it difficult to cover product shortfall in one region with oversupply from another. For example, California requires reformulated gasoline that meets specifications defined by the California Air Resources Board (CARB), so-called CARB gasoline, while other areas of PADD 5 require reformulated gasoline that meets the specifications defined by the U.S. Environmental Protection Agency[4] (EPA). Arizona requires cleaner-burning gasoline for ozone and carbon monoxide nonattainment areas in the state, the latter to comply with the EPA Oxygenated Fuel specification.[5]

Table 2 provides information on gasoline specifications for different areas of PADD 5.

[4] Reformulated gasoline (RFG) is gasoline blended to burn more clearly than conventional gasoline and to reduce smog-forming and toxic pollutants in the air. The RFG program was mandated by Congress in the 1990 Clean Air Act amendments, and RFG is required in cities with high smog levels and is optional elsewhere. RFG is currently used in 17 states and the District of Columbia. About 30% of gasoline sold in the United States is reformulated.
[5] Federal EPA Winter Oxygenated Fuel programs increase fuel oxygen and are mandated in certain areas for carbon monoxide control. The winter oxygenated fuel season is generally October through February or March.

Table 2. PADD 5 gasoline specifications

Specifications	California Summer CARBOB Regular Grade	Nevada Summer CBOB Regular Grade	Arizona Summer AZBOB Regular Grade	Sub-Octane Conventional Regular Grade	Federal Reformulated RBOB Regular Grade[6]	Conventional Regular Grade[6]
Summer Reid Vapor Pressure (psi max)[1]	5.99	9.0/7.8	5.7	8.0 [2]	Varies [3]	9
Distillation T50 (deg. F)[1]	232	170 min	E200 (25-65%)	170 min	E200 (30-70%)	250
Distillation T90 (deg. F, max)[1]	335		E300 (65-100%)		E300 (70-100%)	374
Benzene (vol % max)[4]	1.22					3.8
Aromatics (vol % max)[1]	38.7	25	55		50	-
Olefins (vol % max)[1]	11.1		27.5			
Sulfur (PPM wt% max)[1, 4]	21	80	89	80	80	80
Road Octane (R+M/2)[5]	87	87	87	87	87	87

[1] These values are caps. These properties as well as others are inputs into the CARB and Federal Complex models.
[2] If RVP waiver applies, this is 9 psi max.
[3] Varies by state or local requirements and whether RVP waiver applies.
[4] Benzene and sulfur are subject to annual averaging requirements. Annual averages are 1.0% and 30 ppm maximum for benzene and sulfur respectively.
[5] Octane after blending with 10% ethanol (EtOH).
[6] Specifications generally used for exports.
Source: Kinder Morgan Pacific Operations Specification Manual, Colonial Pipeline Company Product Codes and Specifications

Diesel fuel sold in California must meet the unique CARB diesel specifications.[6] These stringent requirements limit out-of-state sources of diesel supply to California; however this is typically not a concern because California produces more diesel fuel than is consumed in the state.

Most transportation fuels consumed in PADD 5 must also comply with the federal Renewable Fuels Standard (RFS). Some PADD 5 state programs also encourage the use of renewable fuels. California's Low Carbon Fuel Standard (LCFS) is designed to reduce by 10% the average lifecycle carbon intensity of the motor gasoline and diesel transportation fuel pool, including all petroleum and nonpetroleum components, sold for consumption in California from 2012 to 2020. The lifecycle carbon intensity of a fuel is a measure of greenhouse gas emissions associated with producing and consuming the fuel. The Oregon Renewable Fuel Standard that was adopted in 2005 set a requirement for B5 biodiesel, which requires a minimum 5% biodiesel blending level in diesel fuel.

[6] CARB diesel requires lower aromatic hydrocarbon content and a higher cetane number. Aromatic hydrocarbons are a class of chemical substances characterized by having molecular structures called benzene rings. Cetane number is an indicator of the combustion speed of diesel fuel.

The three renewable fuels used in transportation fuels are ethanol, biodiesel, and renewable diesel.[7] PADD 5 ethanol plants had a total nameplate production capacity of 510 million gallons per year (gal/y) in 2015. Ethanol is also supplied to mainland PADD 5 states from the Midwest by rail and to Hawaii from the West Coast by tanker. Sugarcane ethanol, which has lower carbon intensity than corn ethanol, is imported into PADD 5 from Brazil and the Caribbean, when economic. Use of sugarcane ethanol is driven by California's LCFS.

Biodiesel production capacity is concentrated in Washington with 107 million gal/y. Total PADD 5 biodiesel production capacity was 191 million gal/y in 2015. Imports are the principal source of renewable diesel, primarily from Asia.

Table 3. Ethanol producers and production by state

State	Number of producers	Nameplate production capacity (million gallons per year)
Alaska	—	—
Arizona	1	275
California	5	200
Hawaii	—	—
Nevada	—	—
Oregon	1	35
Washington	—	—
Total PADD 5	**7**	**510**

— = No data reported.
Nameplate capacity: volume of denatured fuel ethanol that can be produced during a period of 12 months under normal operating conditions.
Number of producers is a count of plants with operable capacity as of January 1, 2015.
Source: U.S. Energy Information Administration, Form EIA-819 Monthly Oxygenate Report

[7] Biodiesel refers to fatty acid methyl esters produced by a chemical reaction between vegetable oils or animal fats and alcohol (transesterification), and is most commonly blended with petroleum diesel in up to 5% by volume or 20% by volume (B5 and B20). Renewable diesel refers to a diesel-like fuel that is compatible with existing infrastructure and in existing engines in any blending proportion. It is produced by refining vegetable oils or animal fats using a hydrotreating process.

Table 4. Biodiesel producers and capacity by state

State	Number of producers	Annual production capacity (million gallons per year)
Alaska	1	0
Arizona	1	2
California	7	59
Hawaii	1	6
Nevada	—	—
Oregon	1	17
Washington	3	107
Total PADD 5	**14**	**191**

—= No data reported.
Number of producers is a count of plants with operable capacity as of June 2015.
Source: U.S. Energy Information Administration, Form EIA-22M Monthly Biodiesel Production Survey

Market structure

The PADD 5 market for gasoline is both large and complex. The number of different gasoline specifications, the uniqueness of the specifications, the close balance between in-region supply and demand, and the relative price inelasticity of gasoline demand combine to create a volatile market.[8]

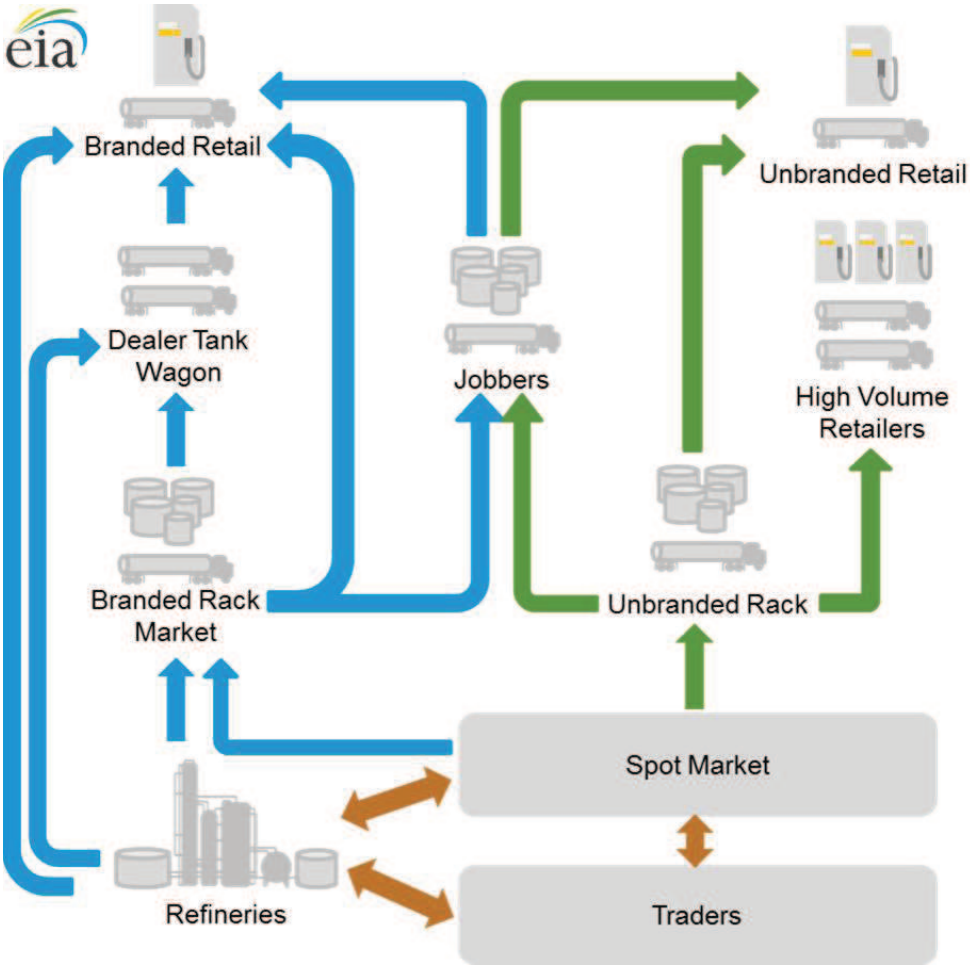
The gasoline market includes four separate but interrelated markets:

- **The spot market,** where sizeable volumes, typically parcels of at least 1 million gallons, are sold at the refinery gate or from imported cargoes, and delivered into a specified pipeline or storage facility, as agreed by the buyer and seller. There are about 15 to 20 participants in the West Coast spot market, including refiners that buy and sell products to balance refinery production and sales commitments, trading companies that are in the business of buying and selling gasoline but that typically have no presence in wholesale or retail gasoline markets, brokers with market knowledge and understanding that identify buyers and sellers and arrange deals, and independent retail marketers that move large volumes of gasoline through their own retail outlets. Prices in the spot market move with perceived changes in refinery supply and demand. There are three major spot markets for gasoline in PADD 5, located in the major refining centers of Los Angeles, San Francisco, and the Pacific Northwest. Prices in these markets reflect regional supply/demand balances as well as the cost to move product between the markets and product quality differences.
- **The rack market**, where wholesale buyers such as independent retailers or distributors that operate their own trucks purchase product delivered into a tank truck at a truck loading rack located at a storage and distribution terminal or refinery. Rack market participants may buy branded products that will be sold at a retail outlet under the name of a major oil company or may alternatively purchase unbranded products destined for sale at independent service stations or for use by commercial/industrial consumers. Branded and unbranded rack pricing varies.

[8] Updated from Stillwater Associates. *California Strategic Fuels Reserve – Consultant Report to the California Energy Commission.* July 2002. http://www.energy.ca.gov/reports/2002-03-11_600-02-004CR.PDF

- **The dealer tank wagon (DTW) market**, where branded retail outlets (dealers) purchase branded gasoline that is delivered by tank truck (tank wagon) to their retail outlets. The price of the gasoline reflects the cost of the product and the cost of delivery.
- **The retail market**, where gasoline is sold to the end consumer at the pump at a gas station or other retail outlet. Retailers typically set prices by comparison to prices at other retail outlets. However, high volume retailers (HVRs), such as large chain stores, or *big box* store, that are focused on selling large volumes of gasoline at low margins, tend to price gasoline based on cost plus the desired margin, rather than based on prices at other retail outlets.

Figure 7. Gasoline market structure



Source: U.S. Energy Information Administration, California Strategic Reserve Study[9]

Over the past 10 years, the PADD 5 gasoline market has changed. The number of spot market participants has decreased as refinery ownership consolidation and as increased reliance on in-region refinery production of gasoline has reduced opportunities for trading companies and brokers to

[9] Stillwater Associates. *California Strategic Reserve Study – Consultant Report.* March 10, 2002. http://www.energy.ca.gov/reports/2002-03-11_600-02-004CR.PDF.

participate in the market. Most integrated refiner-marketers have divested their retail chains, and many of the new retail operators, including hypermarkets and big box retailers, now purchase gasoline at an unbranded rack price.

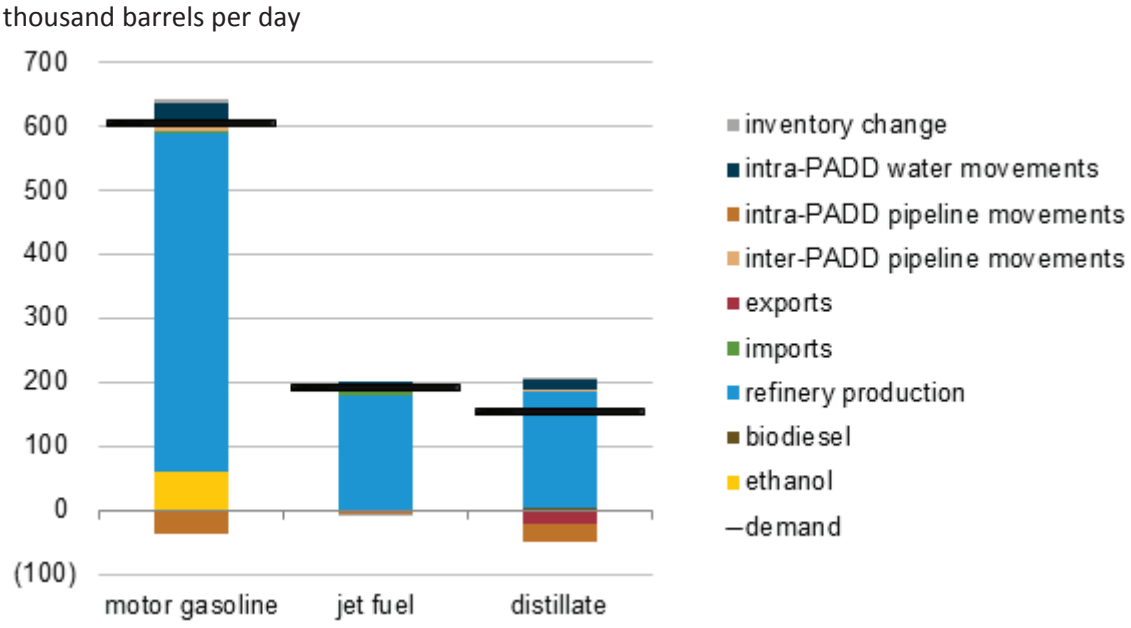
The PADD 5 market structure, notably the region's geographic isolation, unique product specifications that have increased reliance on in-region refinery production, and infrastructure limitations, can restrict both short-term and long-term responses to supply shortfalls, such as those resulting from supply chain disruptions, like refinery outages. Short-term measures to increase product supply typically include withdrawals from inventory, when available, and waterborne shipment of increased production from refineries in the region that have spare processing capacity. However, the range of product specifications across PADD 5 can make it difficult to translate inventory to other regions, and not all product specifications can be produced at all refineries. In addition, the availability of the coastwise-compliant marine vessels that are required to move fuels within the region can make it difficult to move product to where it is needed. Longer-term solutions to supply disruptions include imports from Asia and Canada as well as transfers from other U.S. refining centers like the Gulf Coast; however, only a limited number of refineries outside PADD 5, both inside and outside the United States, can manufacture product to meet all PADD 5 specifications, notably the CARB gasoline and CARB diesel specifications. As a result, when PADD 5 transportation fuel supply is disrupted, wholesale and retail prices often increase more than would be expected in other regions, like the Gulf Coast and East Coast, where alternative sources of supply are closer and more readily available, and thus lower cost.

Southern California and Southern Nevada

The Southern California and Southern Nevada (SCSN) region includes the southernmost counties of California[10] as well as the Las Vegas, Nevada metropolitan area of Southern Nevada. The region accounts for more than 40% of total PADD 5 motor gasoline demand, the largest share of motor gasoline demand of the six regional PADD 5 markets, and about 7% of total U.S. demand. Because of the many military air bases and large commercial aviation hubs, jet fuel demand in the SCSN region accounts for about 45% of total PADD 5 jet fuel demand and 14% of U.S. demand. SCSN accounts for 32% of total PADD 5 distillate fuel demand, which is about 4% of U.S. demand.

A combination of in-region refinery production, marine-delivered fuels produced at refineries in Northern California and Washington State, receipts of fuels produced at refineries in other PADDs, and imports from the global market supply the SCSN region with transportation fuels. The regional refineries do not produce sufficient gasoline or jet fuel to meet in-region demand, but they do produce more distillate than is consumed in the region. In-region refinery production is supplemented with marine deliveries of product from refineries in Northern California and Washington State as well as imports from the global market. Transportation fuels produced at SCSN refineries also supply Arizona and some are exported into the global market. Exports are primarily distillate fuel, which may not meet in-region specifications.

Figure 8. Southern California and Southern Nevada 2013 supply/demand balances



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

[10] The southernmost counties of California are Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.

Supply and logistics

There are eight operating refineries in the Southern California and Southern Nevada region, and these refineries supply most of the motor gasoline, jet fuel, and distillate consumed in the region. The refineries have combined atmospheric crude distillation unit capacity of 1,019,100 barrels per calendar day.[11] All eight refineries are located in the Los Angeles metropolitan area.

Table 4. Southern California and Southern Nevada refineries

Company	Location	Atmospheric Crude Distillation Unit (ACDU) operating capacity b/cd	Markets served
Valero Asphalt	Wilmington	6,300	
Lunday Thagard	Southgate	8,500	local
Valero	Wilmington	85,000	Southern California (S. CA), Las Vegas, Phoenix
Tesoro	Wilmington	104,500	S. CA, Las Vegas
Phillips 66	Wilmington	139,000	S. CA, Las Vegas
ExxonMobil	Torrance	149,500	S. CA
Tesoro	Carson	257,300	S. CA, Las Vegas
Chevron	El Segundo	269,000	S. CA, Las Vegas, Phoenix

Source: Stillwater Associates analysis of EIA data

In 2013, SCSN refineries produced a total of 526,800 b/d of gasoline, 182,500 b/d of distillate, and 178,100 b/d of jet fuel. This production was sufficient to supply 87% of regional motor gasoline demand (96% when blended with ethanol), 117% of distillate fuel demand, and 92% of jet fuel demand.

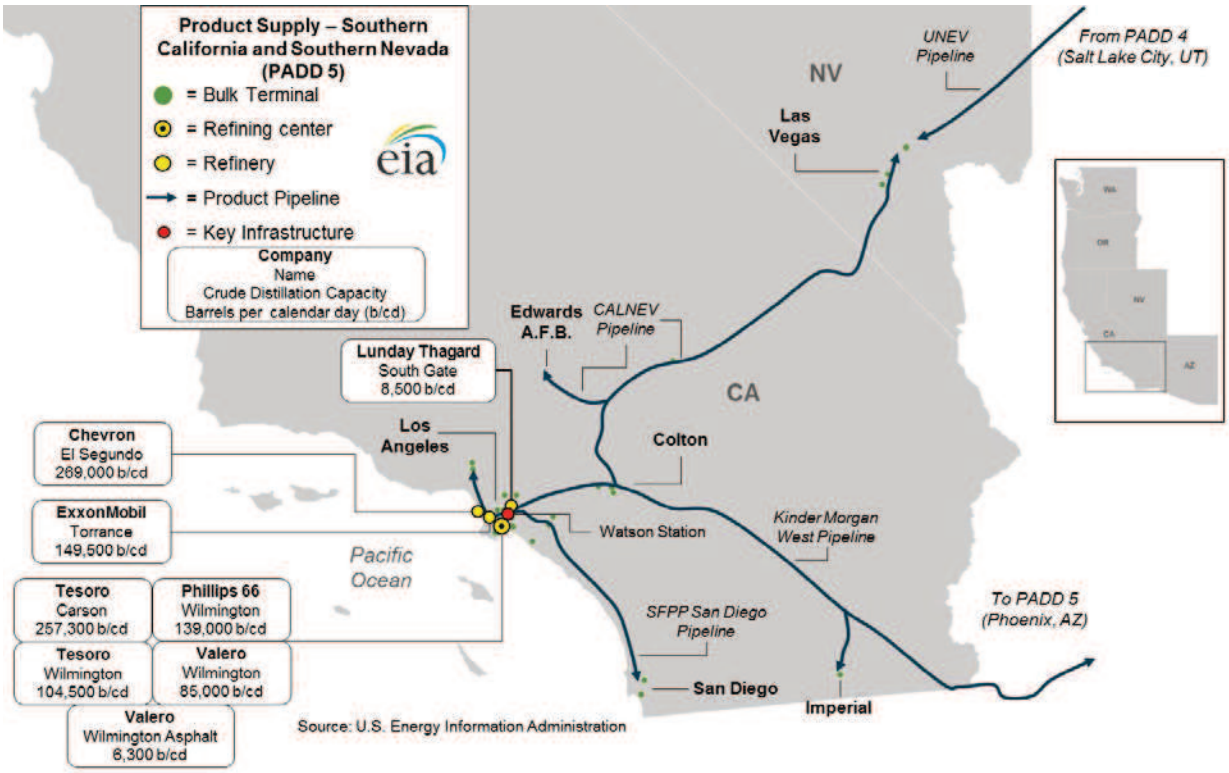
Production from the refineries moves primarily by pipeline from the Los Angeles area to bulk storage and distribution terminals throughout the SCSN region (Figure 9). From terminals, product moves by tank truck to retail outlets. Product from the Los Angeles area also supplies the Arizona Region (Arizona) by pipeline. The Kinder Morgan West Line, which is owned and operated by Kinder Morgan, Inc., originates in the Los Angeles Basin, and in 2013, it moved 35,000 b/d of gasoline, 6,000 b/d of jet, and 28,000 b/d of distillate to Phoenix, Arizona. This supply reduces the availability of product to supply the SCSN region, which is especially important for motor gasoline.

Transportation fuels produced at refineries in Salt Lake City, Utah, in PADD 4, also supply SCSN. The UNEV Pipeline[12] runs from Salt Lake City, Utah to North Las Vegas, Nevada and in 2013 moved 9,000 b/d of gasoline and 1,000 b/d of distillate to Las Vegas.

[11] Barrels per calendar day is a measure of the amount of input that a distillation unit can process in a 24-hour period under usual operating conditions. It takes into account both planned and unplanned maintenance. Barrels per stream day, another measure of refinery capacity, is the maximum number of barrels of input that a distillation facility can process within a 24-hour period when running at full capacity under optimal crude and product slate conditions with no allowance for downtime. Stream day capacity is typically about 6% higher than calendar day capacity.

[12] UNEV Pipeline, LLC is a joint venture between a subsidiary of Holly Energy Partners, L.P. and Sinclair Transportation Company.

Figure 9. Southern California and Southern Nevada refineries and petroleum product flows



Most of the major product distribution pipelines in the SCSN region can move product to and from more than one refinery and more than one terminal, which provides flexibility in sourcing product and ensuring that product is available for distribution to retail outlets. However, in the Los Angeles metropolitan area, there are large bulk storage and distribution terminals that are part of closed systems supplied by a single refinery. Disruptions to these closed systems can require changes to the pattern of product distribution from the terminal to the retail outlet, which can lengthen supply times and increase supply costs.

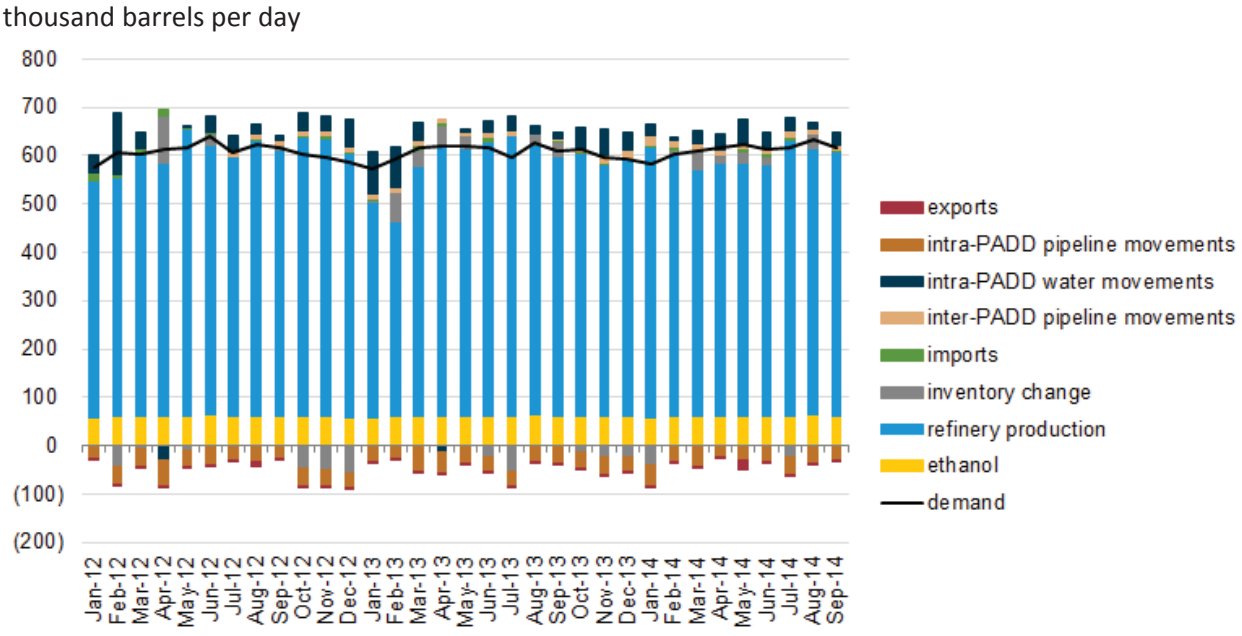
Refineries, pipelines, ports, and storage facilities are all critical to the effective functioning of the petroleum supply chain. However, in the SCSN region, Watson Station, a pipeline hub in Carson, California, is particularly important. Product from many of the region's refineries must move through Watson Station to reach bulk storage and distribution facilities. Power outages and earthquakes can affect the region's infrastructure.

Motor gasoline supply/demand

SCSN refineries produced sufficient gasoline to supply about 87% of in-region motor gasoline demand (96% when blended with ethanol) in 2013, although a portion of that gasoline was used to supply the Arizona region. Gasoline supplied from refineries in Northern California and Washington State and shipped by marine vessel and imports from the global market provided additional supply. Historically, the SCSN region has imported small quantities of gasoline, including gasoline-blending components, primarily from Canada and Asia. However, since March 2015, because of the continuing outage of gasoline-producing units at the Torrance refinery, gasoline imports have increased substantially. Several weeks after the Torrance, California, outage, West Coast gasoline imports more than tripled, and averaged 81,000 b/d from March 27 through June 26. Monthly data through April 2015 show California total gasoline imports coming from South Korea, Singapore, and Taiwan in Asia as well as Sweden, the United Kingdom, Italy, and the Netherlands in Europe. During periods of unplanned refinery outages and other in-region supply disruptions, waterborne supply of gasoline from other PADD 5 regions like Northern California and the Pacific Northwest, other PADDs, and the global market is critical. The availability of product from other PADD 5 regions and other PADDs depends on the availability of coastwise-compliant marine vessels.

The SCSN region exported small volumes of gasoline to Central and South America in 2013, some of which likely did not meet CARB gasoline specifications, and the region continues to supply Arizona via intra-PADD pipeline, about 36,000 b/d.

Figure 10. Southern California and Southern Nevada motor gasoline supply/demand balance



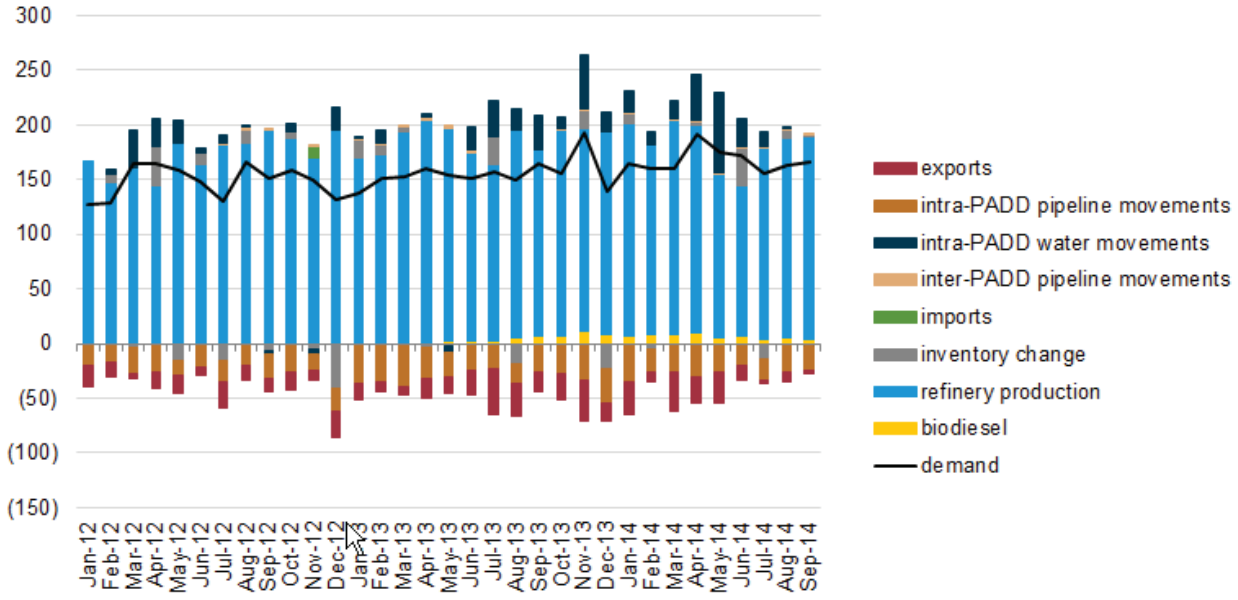
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

Refineries in the SCSN region produce substantially more distillate fuel than is consumed in the region, 17% more in 2013. The region also receives distillate fuel by marine vessel from other sub-PADD 5 regions, 16,000 b/d in 2013, and by pipeline into Las Vegas from PADD 4, 1,200 b/d in 2013. Some of the receipts from within PADD 5 are likely to balance supply/demand of CARB specification diesel, especially during periods of SCSN refinery maintenance. The region also supplies distillate fuel to Arizona, 28,200 b/d in 2013, and exports distillate fuel to Mexico as well as to Central America and South America, about 21,500 b/d in 2013. In Arizona, diesel fuel is required to meet the standard ultra-low sulfur diesel specification, which is less stringent than the CARB diesel specification. As a result, Arizona is an outlet for Southern California diesel production that does not meet CARB specifications. Exports of distillate fuel may also include product that does not meet CARB diesel specifications.

Figure 11. Southern California and Southern Nevada distillate supply/demand balance

thousand barrels per day

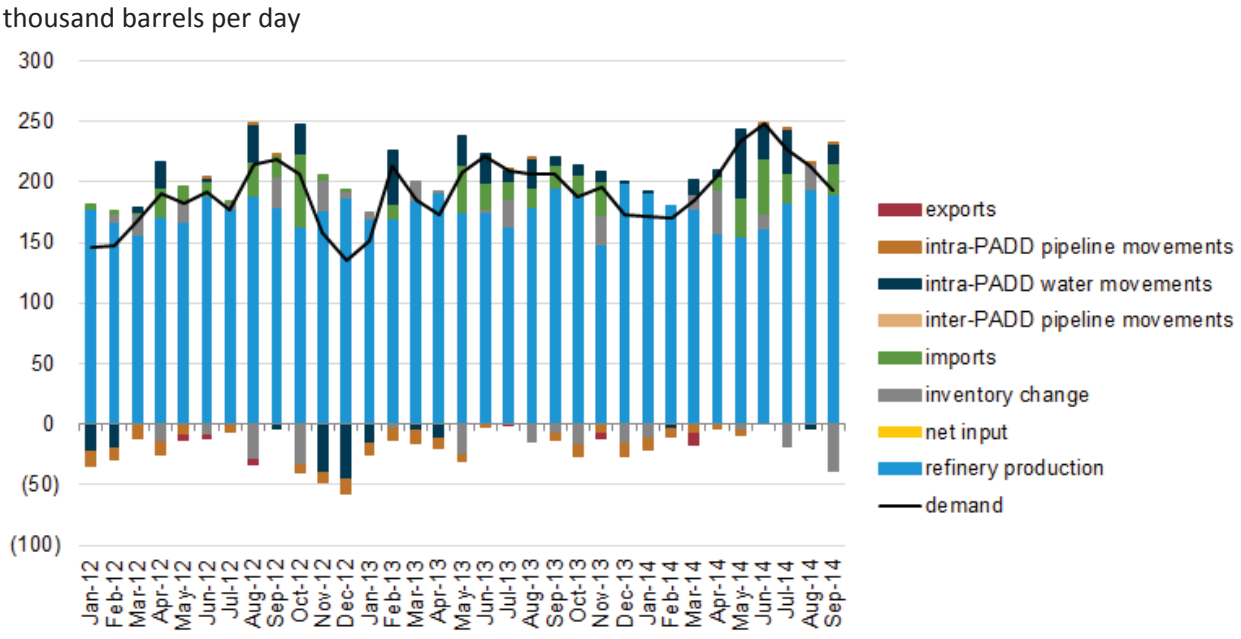


Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

Refineries in the Southern California/Southern Nevada region do not produce sufficient jet fuel to meet in-region demand. In-region refinery production is supplemented with imports and transfers from other regions within PADD 5. The SCSN region also supplies jet fuel to Arizona by pipeline. In 2013, in-region refineries produced jet fuel sufficient to supply 92% of in-region demand. Imports and receipts from other regions of PADD 5 supplied the balance. The region typically imports more jet fuel than either motor gasoline or distillate, and imports are principally from refineries in Asia. Demand patterns for jet fuel are more variable than for gasoline and distillate, and as a result, the region can be caught short if demand rises unexpectedly or if in-region supplies are disrupted. Pipeline flows of jet fuel to Arizona have declined to an average of 6,000 b/d in 2013 as PADD 3 refineries supply increasing volumes to Arizona.

Figure 12. Southern California and Southern Nevada jet fuel supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

The region's demand for biofuels is driven by California's Low Carbon Fuel Standard (LCFS), which creates demand for fuels with lower carbon intensity, including low carbon-intensity corn-based ethanol and sugar-based ethanol, biodiesel, and renewable diesel.

Ethanol blending is limited to 10% by the CARB specification for motor gasoline, which is reflected in ethanol's 10% share of gasoline demand. Ethanol supply is from a combination of imported sugar-based ethanol and receipts from PADD 2 (Midwest) delivered by rail and truck to blending terminals.

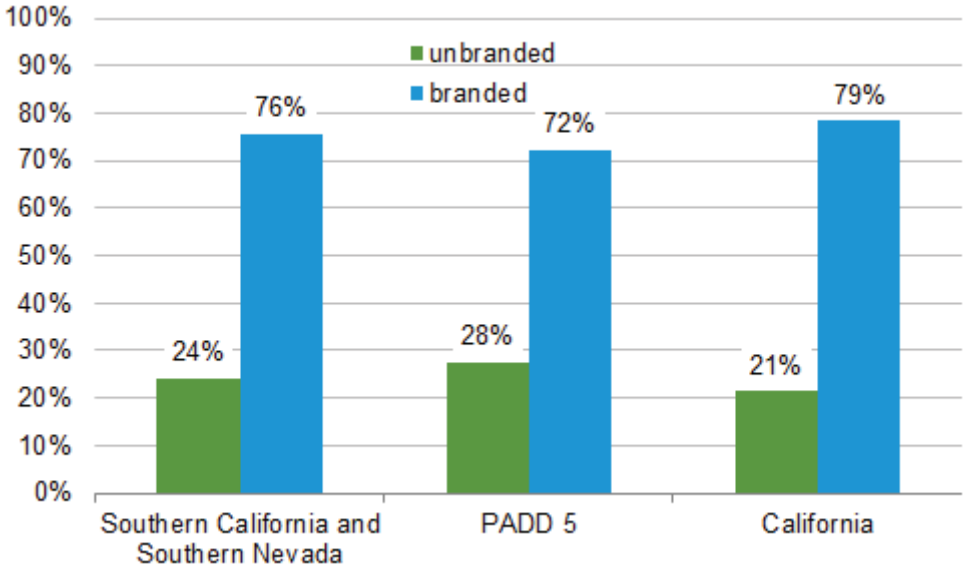
Biodiesel and renewable diesel supplied 2% of the region's distillate demand in 2013 and 4% in the first nine months of 2014. Biodiesel and renewable diesel supply is from a combination of PADD 5 production, receipts from other PADDs, and imports.

Retail markets

There are about 27 distinct branded and unbranded companies participating in the retail market for gasoline and distillate fuel in the Southern California and Southern Nevada region. About 76% of retail outlets are branded, meaning that they are associated with and display a major oil company brand, like Chevron, Shell, 76, Valero, and ARCO. The remaining 24% of retailers are referred to as unbranded because they are not affiliated with a major oil company brand. Unbranded retailers include small independent retailers as well as big box retailers. In California as a whole, 79% of retail outlets are associated with a major brand, while 21% are unbranded. The sale of BP's Southern California business to Tesoro in 2012 resulted in the most recent large-scale shift in the region's retail market structure.

Figure 13. Southern California and Southern Nevada retail market structure

percent of retail outlets



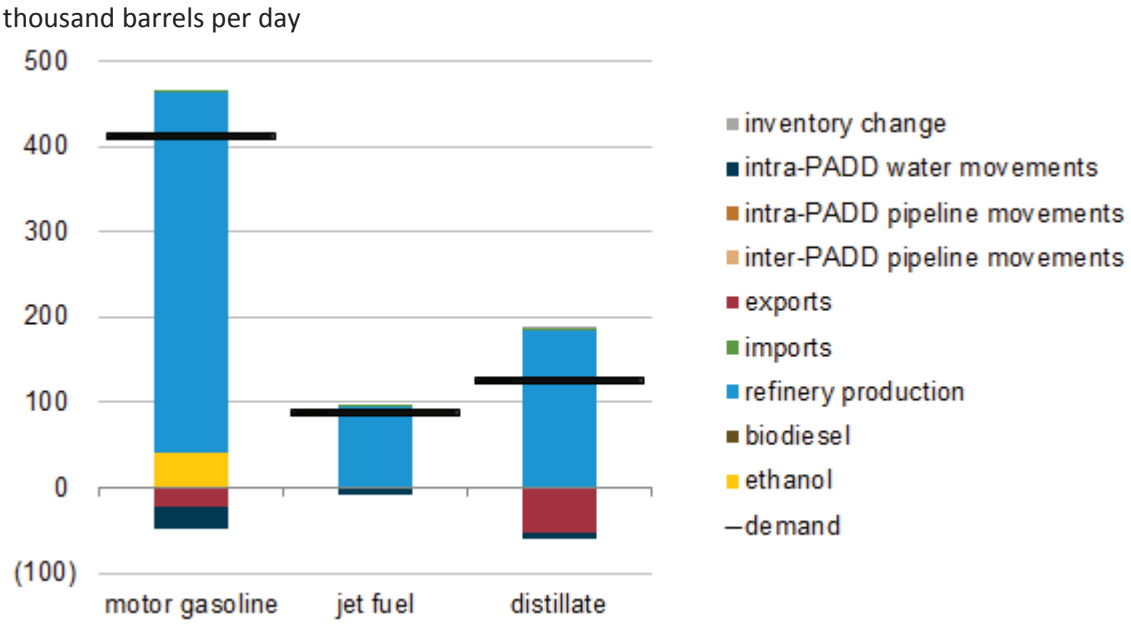
Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

Northern California and Northern Nevada

The Northern California and Northern Nevada region (NCNN) includes counties in California north of San Luis Obispo, Kern, and San Bernardino counties, and in Nevada north of Las Vegas. In 2013, with average motor gasoline demand of 412,000 b/d, the region accounted for 27% of total PADD 5 motor gasoline demand and 4.7% of U.S. motor gasoline demand. NCNN distillate demand of 125,000 b/d in 2013 accounted for 25% of PADD demand and 3% of U.S. demand. NCNN jet fuel demand averaged 88,000 b/d in 2013, 21% of PADD demand and 6% of U.S. demand.

The region is supplied by in-region refinery production and refineries in the region produce more motor gasoline, jet fuel, and distillate fuel than is consumed in the region. As a result, NCNN supplies other regional markets in PADD 5, primarily Southern California and Southern Nevada, with motor gasoline, jet fuel, and diesel fuel, and also exports these products. In 2013, the region exported 22,100 b/d of gasoline, 2,300 b/d of jet fuel, and 52,400 b/d of distillate fuel, primarily to Central and South America.

Figure 14. Northern California and Northern Nevada 2013 supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Supply and logistics

There are nine operating refineries in two primary refining centers in the Northern California and Northern Nevada region with combined atmospheric crude distillation unit capacity of about 885,000 barrels per calendar day. Only one of the refineries is located outside California, in Nevada. The sole refinery in Nevada, Foreland Refining in Ely, produces asphalt and fuel oil rather than motor gasoline, distillate fuel, and jet fuel. Most of the California refining capacity in the NCNN region is in the San Francisco Bay area. Several smaller refineries are located in California's Central Valley.

Table 5. Northern California and Northern Nevada refineries

Company	Location	Atmospheric Crude Distillation Unit (ACDU) operating capacity b/cd	Markets served
Chevron	Richmond	245,271	Northern California (N. CA), Reno, Oregon
Tesoro	Martinez	166,000	N. CA, Reno
Shell	Martinez	156,400	N.CA, Los Angeles, Reno, Nevada, exports
Valero	Benicia	145,000	N.CA, Reno, Nevada, exports
Phillips 66[1]	Rodeo	120,200	S. CA, Las Vegas
Kern Oil & Refining	Bakersfield	26,000	Central California
San Joaquin Refining	Bakersfield	15,000	Central California
Santa Maria Refinery	Santa Maria	9,500	local
Foreland Refining	Ely, Nevada	2,000	local

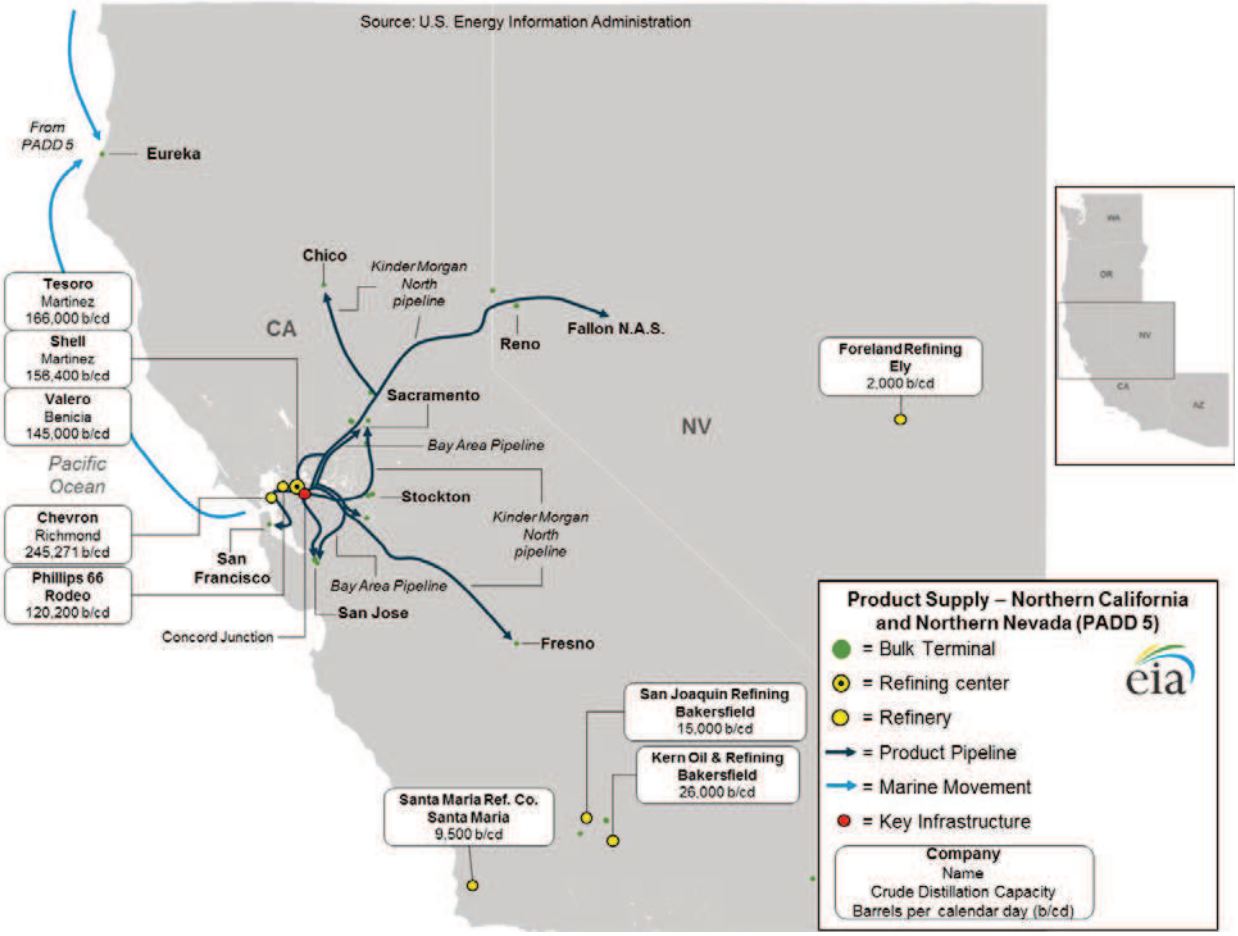
[1]A portion of this facility is actually located in San Luis Obispo County but is operated as part of the Rodeo refinery.
Source: Stillwater Associates analysis of EIA data

In 2013, NCNN refineries produced an average of 421,000 b/d of gasoline blending components and finished motor gasoline, 185,000 b/d of distillate, and 96,000 b/d of jet fuel. This production was more than sufficient to meet in-region demand. NCNN refineries produced product sufficient to meet 102% of regional demand for finished motor gasoline (112% when blended with ethanol), 108% of jet fuel demand, and 147% of diesel fuel demand. Production from refineries in Northern California regularly supplies parts of Southern California and Oregon by marine vessel.

Product is shipped by pipeline from the refineries in San Francisco to storage and distribution terminals in the San Francisco area and to terminals further inland in Fresno and Chico, California, and also in Nevada. The large regional product distribution pipelines are owned and operated as common carrier pipelines by Kinder Morgan, Inc. No pipelines connect the NCNN region to other PADDs or other PADD 5 regional markets, and, as a result, supply from NCNN to those areas moves by marine vessel. The major port facilities through which product is exported into the global market and from which product is shipped to other regional markets in PADD 5 are located on the San Francisco Bay.

Critical supply chain infrastructure includes the refineries, pipelines, ports, and storage facilities of the San Francisco Bay area. In particular, the Concord pipeline junction is the gathering and entry point for the Kinder Morgan pipeline system, the main distribution artery for the region. Power outages and earthquakes can affect the region's infrastructure, and heavy fog can disrupt the port facilities within the San Francisco Bay.

Figure 15. Northern California and Northern Nevada refineries and petroleum product flows

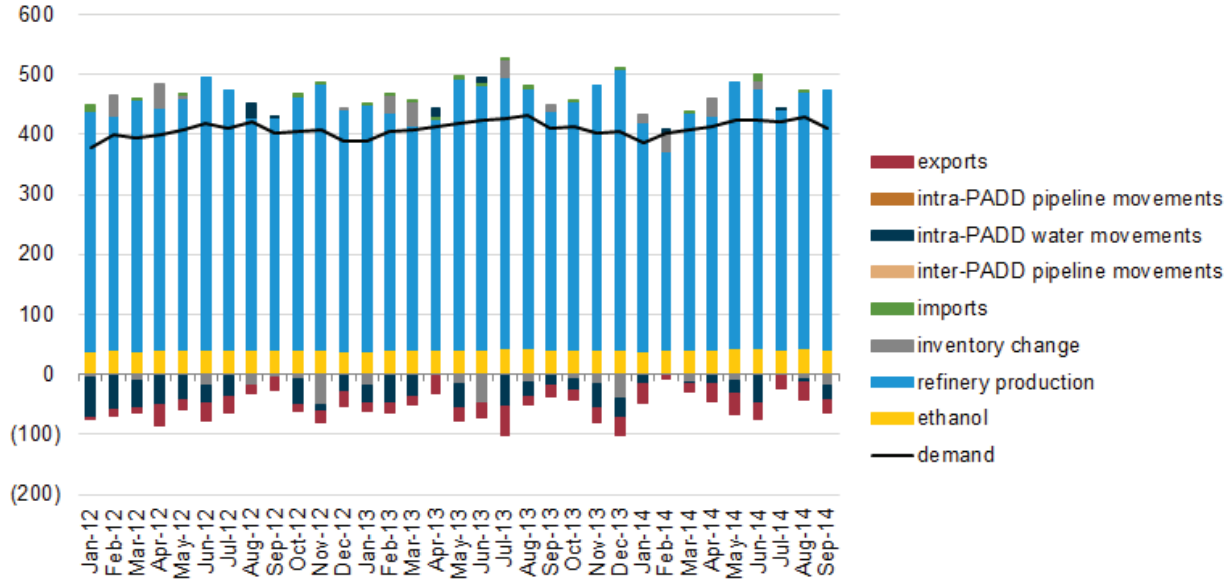


Motor gasoline supply/demand

In 2013, NCNN refineries produced an average of 421,000 b/d of motor gasoline blending components that when blended with ethanol was sufficient to supply about 112% of 2013 finished gasoline demand. Without pipeline interconnections to other regional markets in PADD 5, surplus gasoline must be shipped out of the region by marine vessel. In 2013, the NCNN region supplied about 26,900 b/d to other PADD 5 regional markets, primarily Southern California but also Reno, Nevada, and exported 22,100 b/d into the global market, principally supplying Latin America.

Figure 16. Northern California and Northern Nevada motor gasoline supply/demand balance

thousand barrels per day

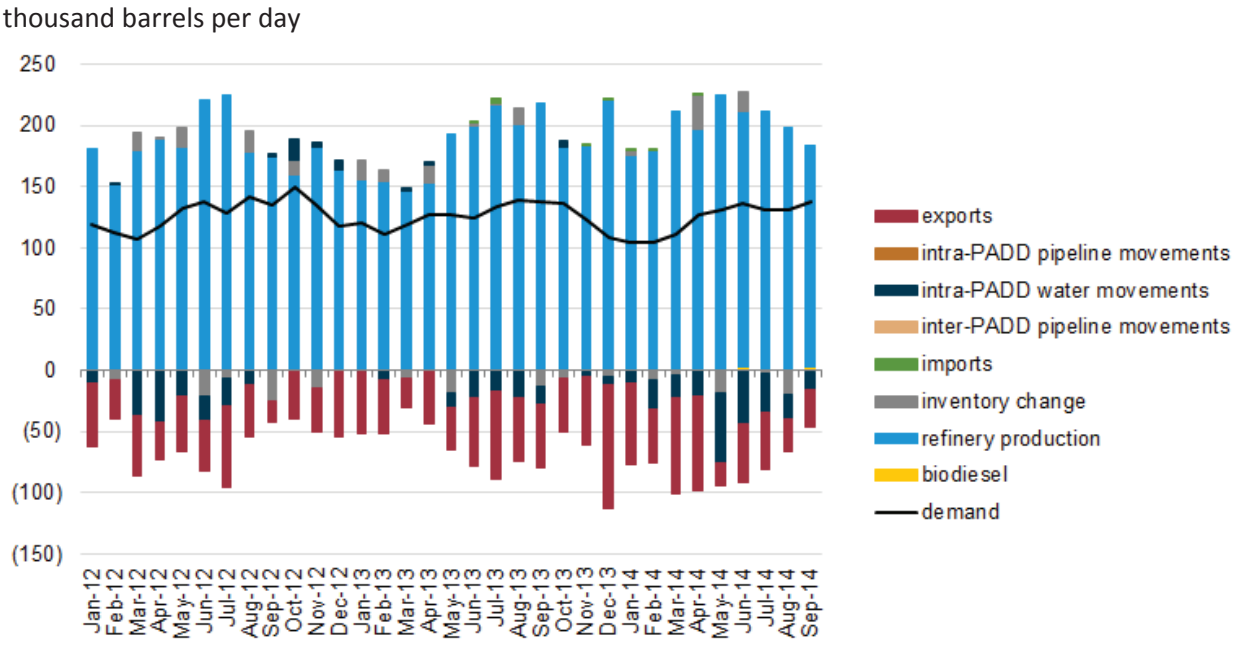


Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

In 2013, NCNN refineries produced an average of 185,000 b/d of distillate fuel, which when blended with biodiesel was sufficient to supply about 147% of finished distillate fuel demand. Without pipeline interconnections to other regional markets in PADD 5, surplus distillate fuel must be shipped out of the region by marine vessel. In 2013, the region transferred 8,200 b/d to other regional markets in PADD 5 and exported 52,400 b/d of distillate, mostly to Central America and South America, principally to Mexico. Because the region produces substantially more diesel fuel than is needed to meet local demand, NCNN has become an important source of diesel fuel for other regions within PADD 5 as well as the Pacific basin.

Figure 17. Northern California and Northern Nevada distillate supply/demand balance



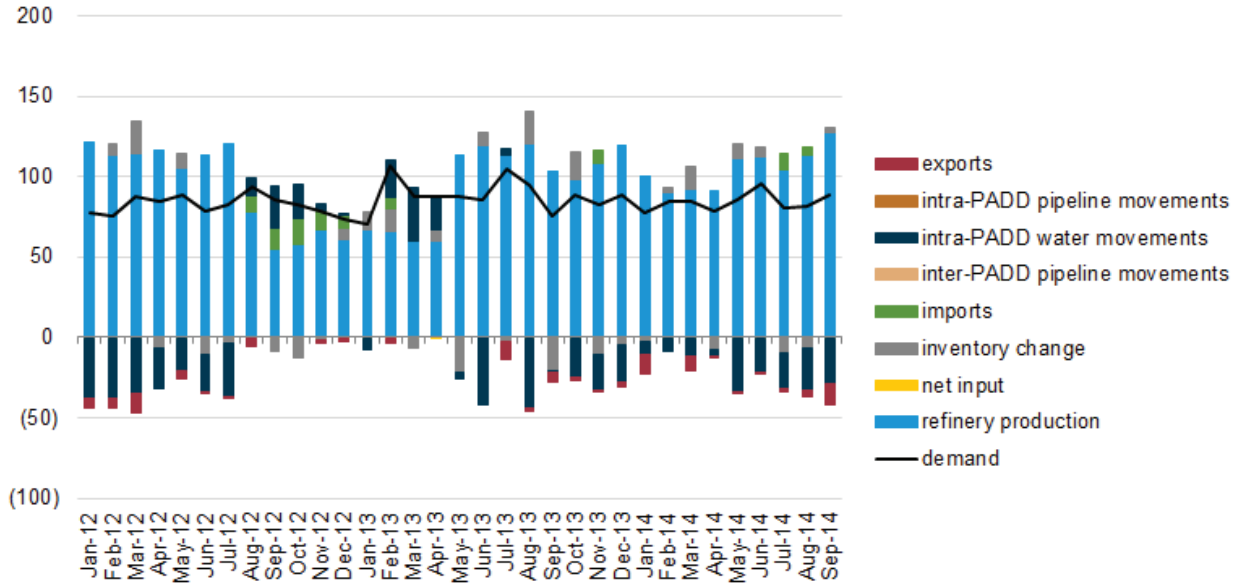
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

The Northern California and Northern Nevada region produces more jet fuel than is consumed in the region, albeit by a much narrower margin than distillate fuel, with in-region refineries producing about 96,000 b/d on average in 2013, 108% of regional demand. The region has also imported small volumes of jet fuel, likely to balance the timing of supply and demand and/or to take advantage of economic supply opportunities. Refinery production beyond that needed to meet in-region demand is principally shipped to other PADD 5 regional markets, but it also is exported. In 2013, about 7,200 b/d was shipped to other PADD regional markets and 2,300 b/d was exported to Canada and Latin America. The region typically produces more jet fuel than is needed to meet in-region demand. However, in the second half of 2012, following a major disruption at Chevron's Richmond refinery, NCNN shifted from producing more jet fuel than needed to meet in-region demand, to producing less. This circumstance illustrates the sensitivity of the Northern California region as well as the sensitivity of PADD 5 as a whole to refinery disruptions.

Figure 18. Northern California and Northern Nevada jet fuel supply/demand balance

thousand barrels per day



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

The region's demand for biofuels is driven by California's Low Carbon Fuel Standard (LCFS), which creates demand for fuels with lower carbon intensity, including low carbon-intensity corn-based ethanol and sugar-based ethanol, biodiesel, and renewable diesel.

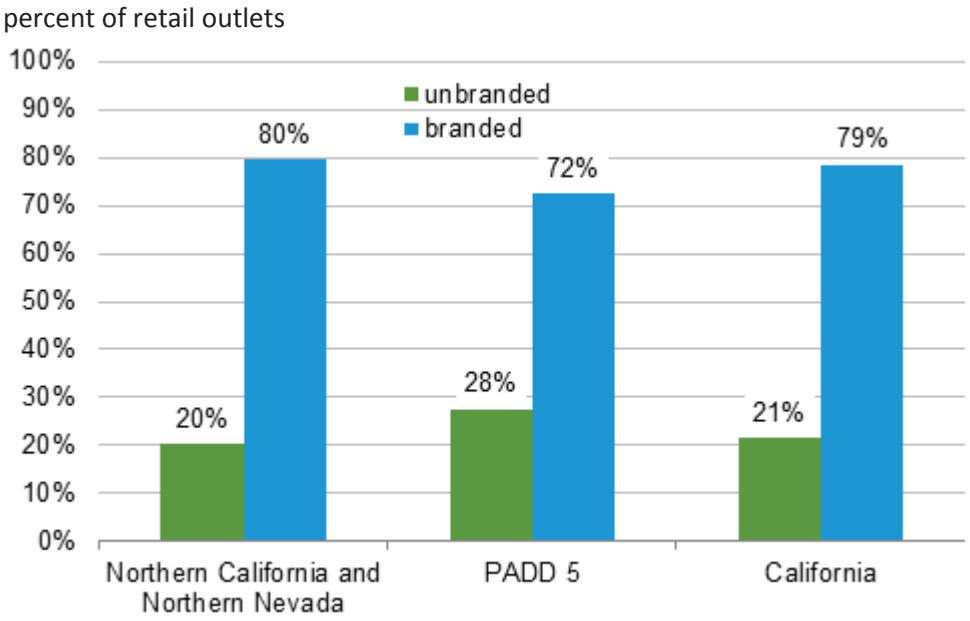
Ethanol blending is limited to 10% of the CARB specification for motor gasoline, which is reflected in ethanol's 10% share of gasoline demand. Ethanol supply is a combination of imported sugar-based ethanol and receipts from the PADD 2 (Midwest) delivered by rail and truck to blending terminals.

Biodiesel and renewable diesel supplied a very small percentage of the region's distillate demand in 2013, less than 1%. Biodiesel and renewable diesel supply is from a combination of PADD 5 production, receipts from other PADDs, and imports.

Retail markets

In the Northern California and Northern Nevada region, 80% of retail outlets are branded and 20% are unbranded. In Northern California, about 21 branded and unbranded companies participate in the retail market for gasoline and distillate fuel,[13] compared with about 12 in the Reno/Carson City, Nevada market. In Northern California, major oil company branded outlets dominate the retail sector, and the top five brands have 76% of the number of retail outlets. The Reno/Carson City market is characterized by a mix of branded and unbranded retail outlets.

Figure 19. Northern California and Northern Nevada retail market structure



Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

[13] Northern California counties with less than 1% of total state gasoline sales are excluded from these numbers.

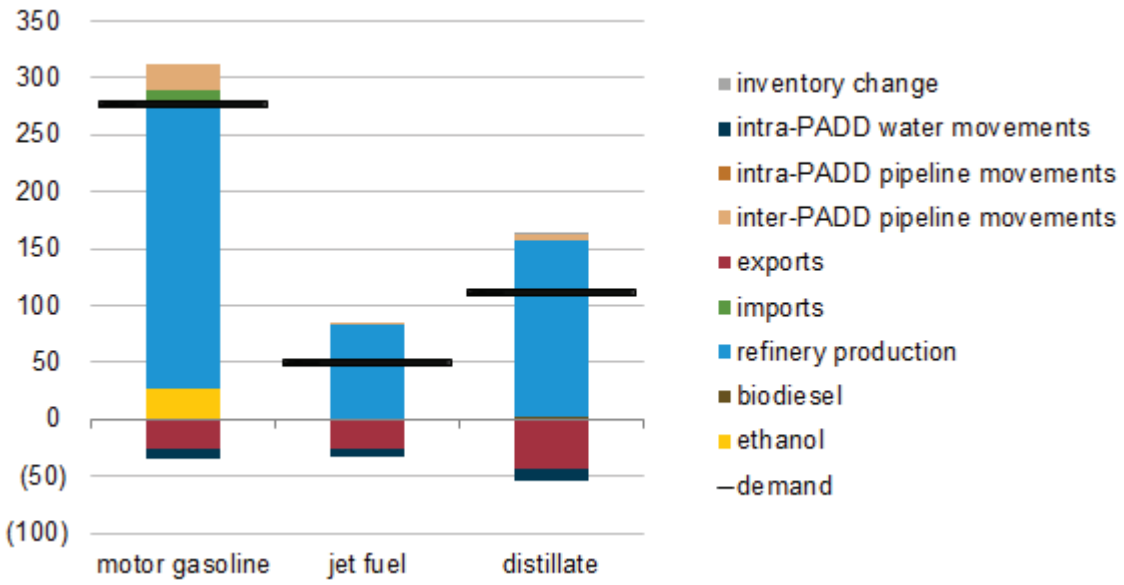
Pacific Northwest

The Pacific Northwest region (PNW) includes Oregon and Washington. In 2013, with 277,300 b/d of motor gasoline demand, the region accounted for 18% of total PADD 5 motor gasoline demand and 3% of total U.S. demand. At 111,400 b/d, PNW demand for distillate fuel was 23% of PADD 5 demand and 3% of U.S. demand. Jet fuel demand in the Pacific Northwest averaged 51,400 b/d in 2013, 12% of PADD 5 demand and 4% of U.S. demand.

The region is supplied by a combination of in-region refinery production, imports, and receipts of product manufactured at refineries in other PADDs. Refineries in the PNW produce about as much gasoline as is consumed in the region, but considerably more than enough distillate fuel and jet fuel than is needed to meet in-region demand. The region supplies distillate fuel and jet fuel to the global market and to other regions within PADD 5 and also exports motor gasoline. PNW also imports motor gasoline and a small amount of distillate. The combination of imports and exports reflects the configuration of the distribution system and gasoline grade imbalances. The PNW typically does not receive product from other regions within PADD 5. In 2013, the region exported 26,000 b/d of motor gasoline, 26,800 b/d of jet fuel, and 43,200 b/d of distillate fuel, primarily to Canada, Mexico Central America, and South America.

Figure 20. Pacific Northwest 2013 supply/demand balance

thousand barrels per day



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Supply and logistics

There are five operating refineries in the PNW region, located in and around Puget Sound, Washington. There are no refineries in Eastern Washington or in Oregon. Historically, the PNW refineries processed a

combination of Alaska North Slope crude oil, Canadian crude oil delivered by the Kinder Morgan Trans Mountain Pipeline,[14] and waterborne imports of other globally-produced crude oil. More recently, Bakken crude oil produced in the United States has been added to refinery crude slates. Bakken crude oil is delivered by railroad and has displaced both ANS and waterborne imports.

Table 6. Pacific Northwest refineries

Company	Location	Atmospheric Crude Distillation Unit (ACDU) capacity b/cd	Markets served
BP	Ferndale (Cherry Point)	225,000	Western Washington, Oregon, exports
Phillips 66	Ferndale	101,000	Western Washington, Oregon, exports
Shell	Anacortes	145,000	Western Washington, Oregon, exports
Tesoro	Anacortes	120,000	Western Washington, Oregon
U.S. Oil & Refining	Tacoma	40,700	Western Washington

Source: Stillwater Associates analysis of EIA data

In 2013, PNW refineries produced an average of 253,400 b/d of motor gasoline and motor gasoline blending components, 156,300 b/d of distillate fuel, and 83,600 b/d of jet fuel. This production was sufficient to meet 91% of regional demand for motor gasoline (102% when blended with ethanol), 163% of jet fuel demand, and 138% of distillate fuel demand. Production from refineries in Washington State regularly supplies Alaska and California.

Product is shipped from the refineries by pipeline north and south to supply Portland, Oregon and Seattle, Washington, and product is shipped by marine vessel to supply the global markets and other regions within PADD 5. Many of the Portland, Oregon storage and distribution terminals have access to the Columbia River and can ship and receive product by marine vessel. Each of the five refineries also have associated dock infrastructure for loading and discharging marine vessels, which supports imports and exports of petroleum products.

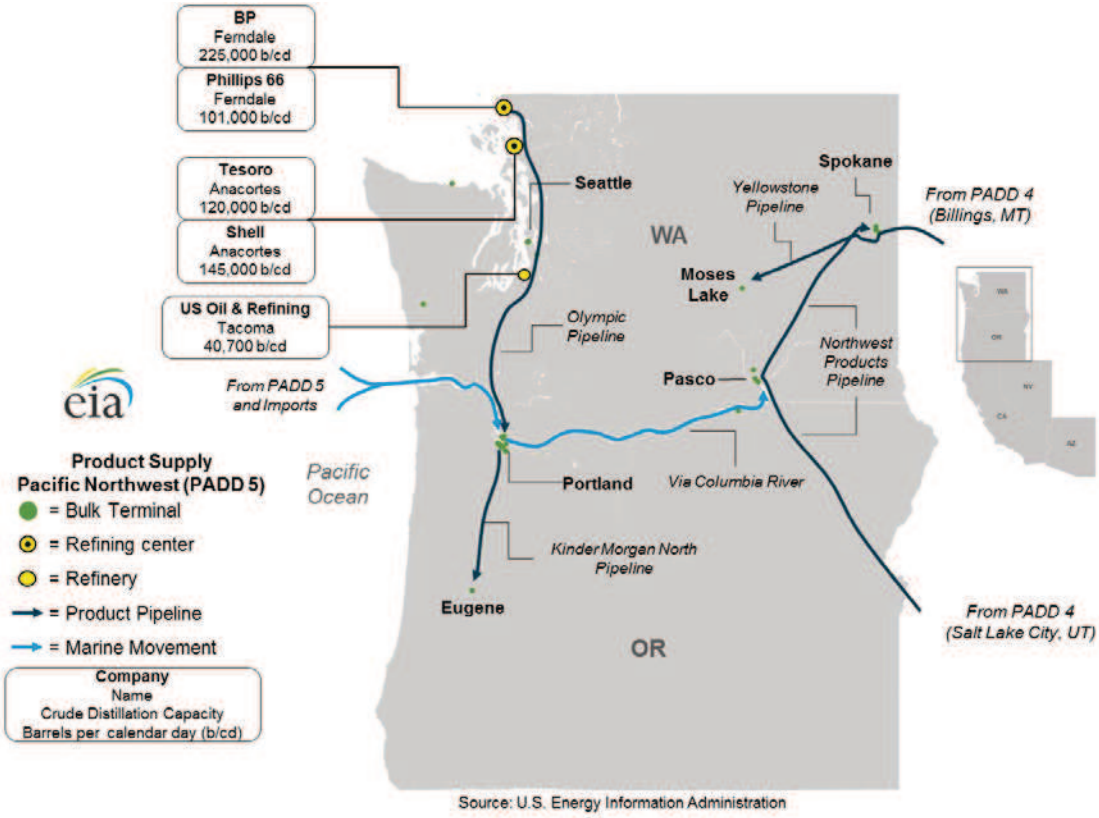
Product moves from storage and distribution terminals in Portland, Oregon south to Eugene, Oregon by pipeline. Distribution infrastructure to move product from the western portions of Washington and Oregon east is limited. The only connection between the western and eastern portions of the region is marine transport along the Columbia River, specifically between Portland, Oregon and Pasco, Washington. There is no pipeline infrastructure to move products across the Cascade Range of mountains. As a result, Eastern Washington is supplied with product from refineries in PADD 4. Product moves by pipeline from Salt Lake City, Utah into eastern Washington and Oregon and by pipeline from refineries in Billings, Montana into eastern Washington.

Critical infrastructure in the region includes the refinery complexes, pipelines, storage and distribution terminals, and the marine facilities at refineries and terminals, notably those along the Columbia River.

[14] The Kinder Morgan Trans Mountain Pipeline (TMPL) transports both crude oil and refined products to the west coast of Canada and the United States. TMPL moves product from Edmonton, Alberta, to marketing terminals and refineries in the central British Columbia region, the Greater Vancouver area, and the Puget Sound area in Washington state, as well as to other markets such as California, the U.S. Gulf Coast, and overseas through the Westridge marine terminal located in Burnaby, British Columbia. Only crude oil and condensates are shipped into the United States.

Weather can disrupt the region's marine facilities. The Olympic pipeline,[15] which runs from Puget Sound to Portland, Oregon and is connected to four of the five PNW refineries, is the main north-south corridor for petroleum product transportation in the PNW region. Disruptions to flows on the Olympic pipeline can have a major impact on regional supply. Many of the storage and distribution terminals connected to the pipeline lack other supply options. As a result, during supply disruptions, product typically supplied from these terminals may need to be sourced from other terminals, which can increase supply costs and therefore prices.

Figure 21. Pacific Northwest refineries and petroleum product flows



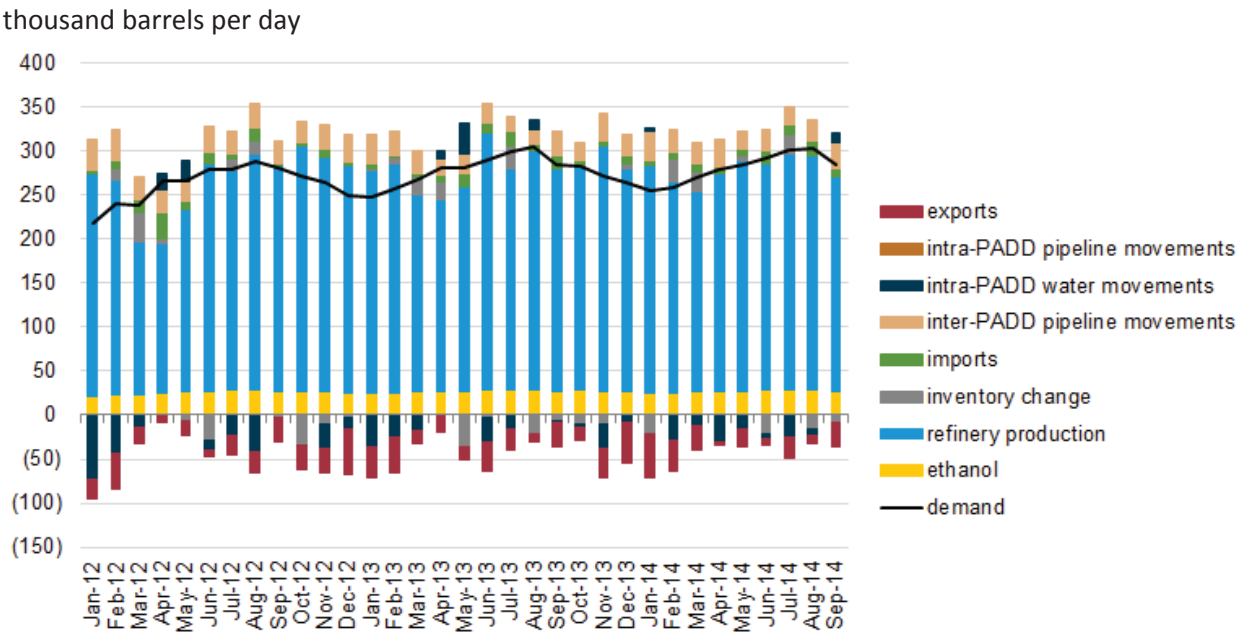
Source: U.S. Energy Information Administration

[15] The pipeline runs along a 299 mile corridor from Blaine, Washington to Portland, Oregon. The system transports gasoline, diesel, and jet fuel. This fuel originates at four Puget Sound refineries, two in Whatcom County and two in Skagit County, and is delivered to Seattle's Harbor Island, Seattle-Tacoma International Airport, Renton, Tacoma, Vancouver, Washington, and Portland, Oregon.

Motor gasoline supply/demand

In 2013, PNW refineries produced an average of 253,000 b/d of motor gasoline, including motor gasoline blending components and finished motor gasoline, about 91% of 2013 demand (102% when blended with ethanol). The PNW region also imports and exports gasoline to balance gasoline quality imbalances and is supplied with gasoline from PADD 4 because it is more efficient to supply the eastern part of the region east of the Cascade Range mountains with product from refineries in Salt Lake City, Utah and Billings, Montana. In 2013, the region imported 8,200 b/d of transportation fuels, mostly from Canada, and was supplied with an additional 15,200 b/d from PADD 4 (Rocky Mountains). The PNW typically does not receive product from other regions within PADD 5. In 2013, the region exported 26,000 b/d of motor gasoline, principally to Mexico and Canada.

Figure 22. Pacific Northwest motor gasoline supply/demand balance



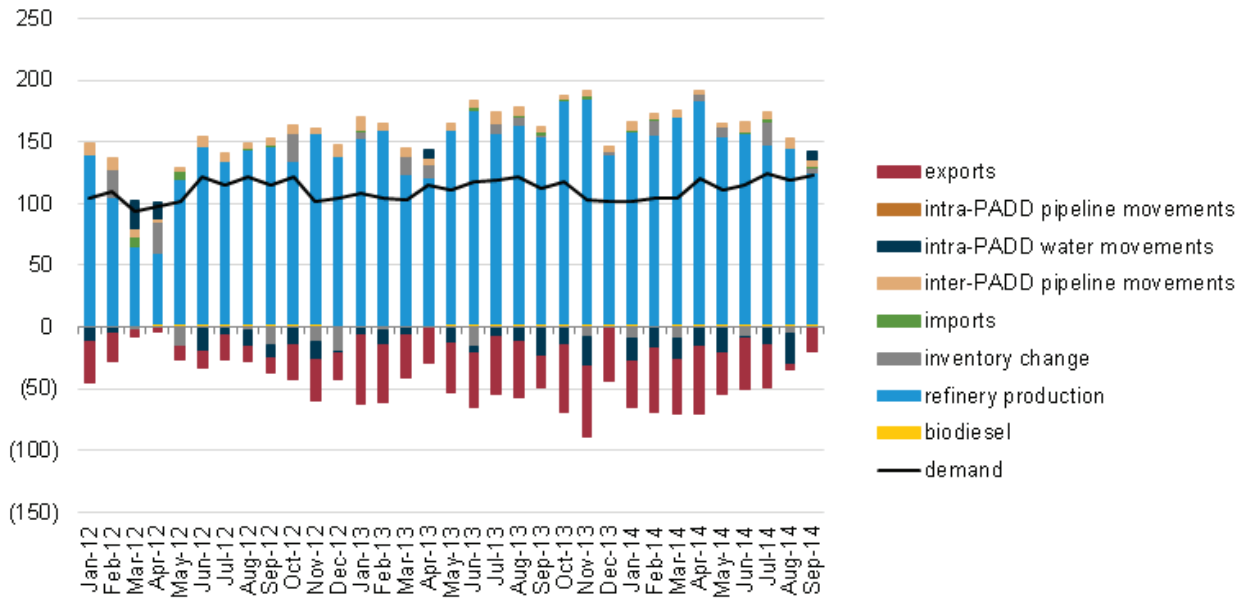
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

The Pacific Northwest produces considerably more distillate fuel than is needed to meet in-region demand. In 2013, the region produced 154,000 b/d of distillate fuel, 138% of demand. The region exports significant volumes of distillate fuel into the Pacific Basin market, 43,200 b/d on average in 2013, to Central and South America, western Canada (which lacks sufficient refining capacity), and Mexico. The Pacific Northwest region also supplies distillate, 10,100 b/d on average in 2013, to the rest of PADD 5 via marine vessel. PADD 4 supplied 5,800 b/d of distillate fuel to the eastern part of the Pacific Northwest region.

Figure 23. Pacific Northwest distillate supply/demand balance

thousand barrels per day



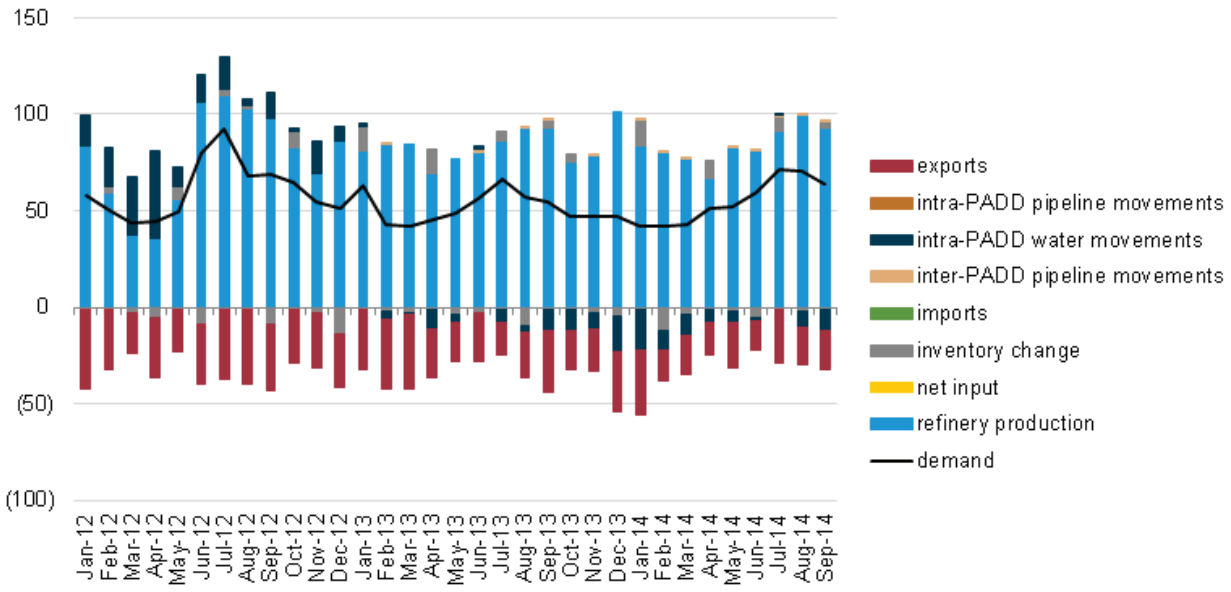
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

Refineries in the PNW region produced approximately 163% of in-region jet fuel demand, or 84,000 b/d on average in 2013, making the region significantly net long jet fuel. The oversupply allowed the region to export 27,000 b/d of jet fuel and to send 7,000 b/d of supplies via marine vessel to other regions of PADD 5 on average in 2013. The region's jet fuel exports were mainly destined for Canada, with smaller amounts bound for Central America, South America, and Asia.

Figure 24. Pacific Northwest jet fuel supply/demand balance

thousand barrels per day



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

Almost all of the gasoline in the Pacific Northwest is blended with ethanol to a level of 10%, driven by the federal Renewable Fuel Standard program and the state's requirement that diesel fuel sold in Oregon must be blended with a minimum of 5% biodiesel. The Oregon Renewable Fuel Standard, which was adopted in 2005, set the requirement for biodiesel blending in the state. Oregon also has a low-carbon fuels law that was passed in 2009 but for which regulations have not been promulgated. The low-carbon fuel law was scheduled to sunset in 2015, however, in February, the Oregon state senate introduced a bill to make the law permanent. In January, the Oregon Environmental Quality Commission proposed regulations to require fuel importers and producers to reduce the carbon content of transportation fuels by 10% over the next decade, starting in January 2016.

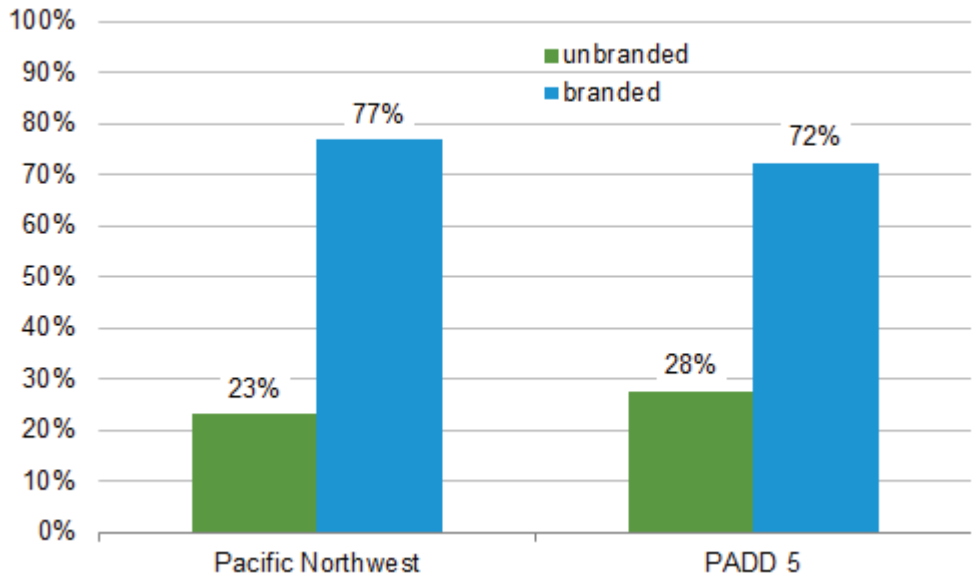
Ethanol supply to the PNW is from a combination of receipts from other PADDs, delivered by rail and truck to blending terminals, and in-region production. Biodiesel, which supplied a small percentage of the region's diesel demand in 2013 (about 2,200 b/d, or about 2% of in-region demand) is supplied primarily from in-region production.

Retail markets

Oregon is one of two states in the country that does not permit customer self-service dispensing of transportation fuels at retail outlets. The mandate has its origins in efforts to support independent gasoline wholesalers, which helped minimize the number of retail outlets owned and operated by major oil companies. The Pacific Northwest actually has a slightly higher percentage of branded outlets compared with PADD 5 overall. The region has about 25 branded and unbranded retailers, with 77% of retail stations selling branded fuels compared with the PADD 5 average of 72%. Brands in the Pacific Northwest include Chevron, Shell, 76, Conoco, ARCO, Pilot, Costco, and Sam's Club.

Figure 25. Pacific Northwest retail market structure

percent of retail outlets



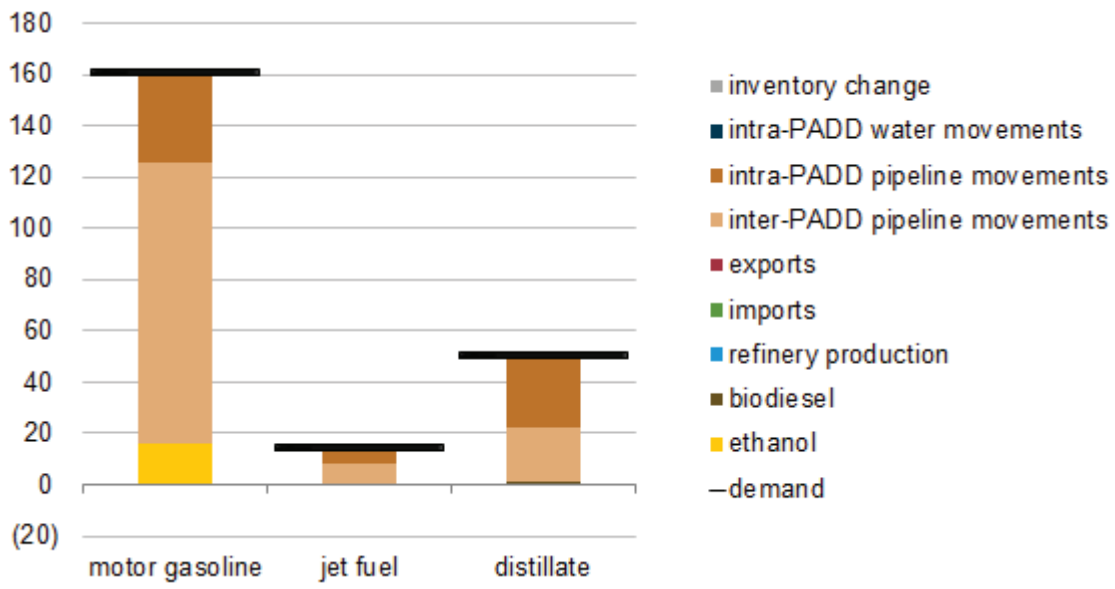
Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

Arizona

Arizona accounts for 11% of demand for motor gasoline in PADD 5, 3% of demand for jet fuel, and 10% of distillate fuel demand. There are no petroleum refineries in Arizona, and the region is supplied with product by pipelines that originate in Southern California and West Texas. In 2013 the region consumed 161,500 b/d of motor gasoline, 14,600 b/d of jet fuel, and 50,600 b/d of distillate fuel.

Figure 26. Arizona 2013 supply/demand balance

thousand barrels per day



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Supply and logistics

Arizona is supplied with all transportation fuels via pipeline from Southern California, New Mexico, and Texas. The 400-mile long Kinder Morgan East Line originates in El Paso, Texas and consists of two parallel pipelines that end in Phoenix, Arizona. Refineries in Texas and New Mexico can supply product into the East Line for delivery to five storage and distribution terminals in Phoenix and two in Tucson, Arizona. A disruption to fuel supply from refineries in New Mexico and West Texas into the East Line reduce East Line supply into Arizona as there may not be sufficient fuels supply or pipeline capacity from other sources to replace the lost fuels supply.

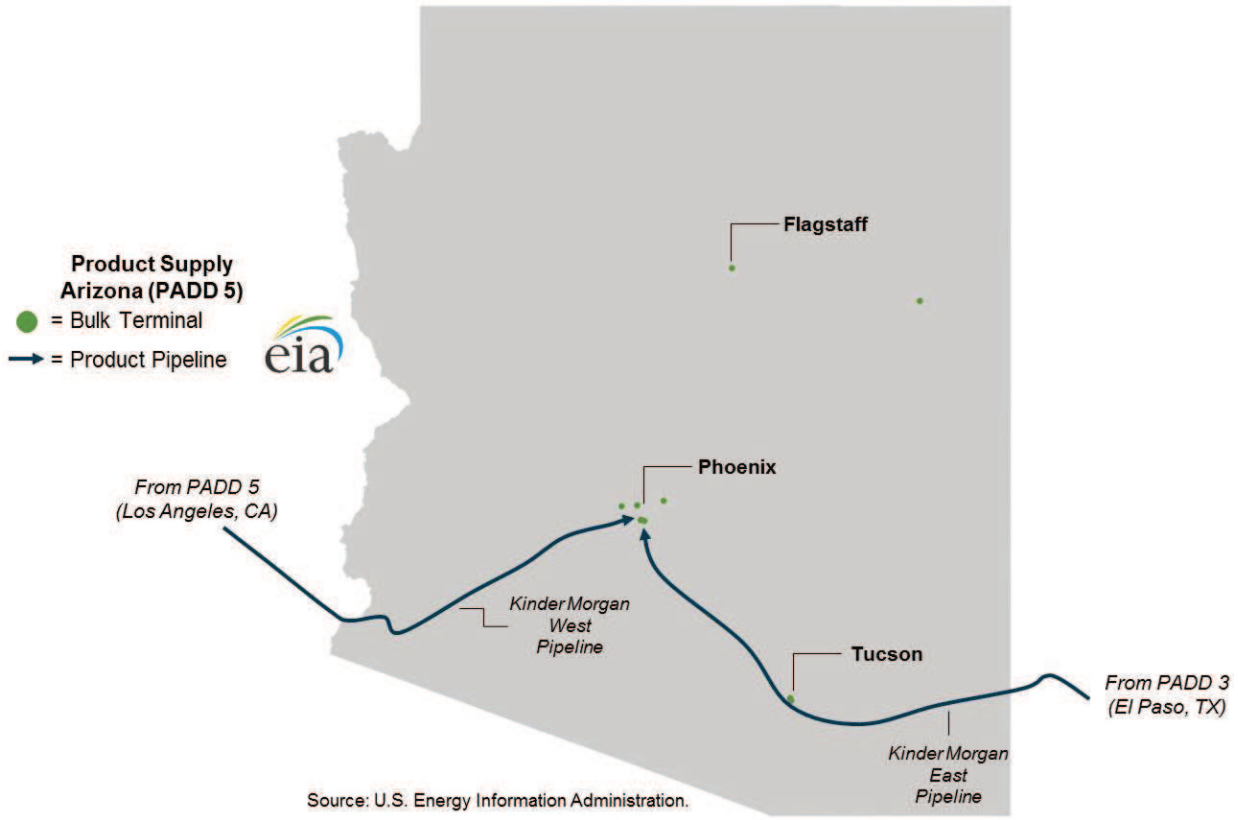
The Kinder Morgan West Line is part of the Kinder Morgan SFPP system. The West Line runs 515 miles from the Watson Station in the Los Angeles Basin to Phoenix, Arizona and delivers product into storage and distribution terminals in Phoenix.

The two pipelines of the East Line operate at close to full capacity, while the West Line operates at well below capacity. As a result, the West Line is a source of incremental supply for Phoenix should supply from the East Line be reduced. However, because the transportation time for fuels delivered into

Phoenix from Los Angeles, California, is about a week to 10 days, incremental supply to Phoenix would not be immediately available. There is no backup pipeline capacity for fuels supply from Phoenix into Tucson. Incremental supply to Tucson is via long-haul trucking.

The Kinder Morgan East and West Lines are critical to fuels supply to Arizona. Train derailments, as well as washouts and pipeline ruptures, have affected the pipelines, sections of which lie in the Union Pacific Railroad right of way. Most disruptions have been of short duration.

Figure 27. Arizona petroleum product flows



Motor gasoline supply/demand

In 2013, Arizona consumed 161,500 b/d of motor gasoline. The Kinder Morgan East pipeline supplied 109,000 b/d, or 67%, of total gasoline from refineries in New Mexico and Texas. An additional 35,000 b/d of gasoline was sourced from Southern California. Arizona's Cleaner Burning Gasoline (CBG) Program calls for a number of different specifications of cleaner burning gasoline in different areas of the state, including the greater Maricopa County area (Phoenix metropolitan area); part of Pinal County, which is between Phoenix and Tucson, and a small portion of Yavapai County; and part of Pima County, which includes the Tucson metropolitan area.

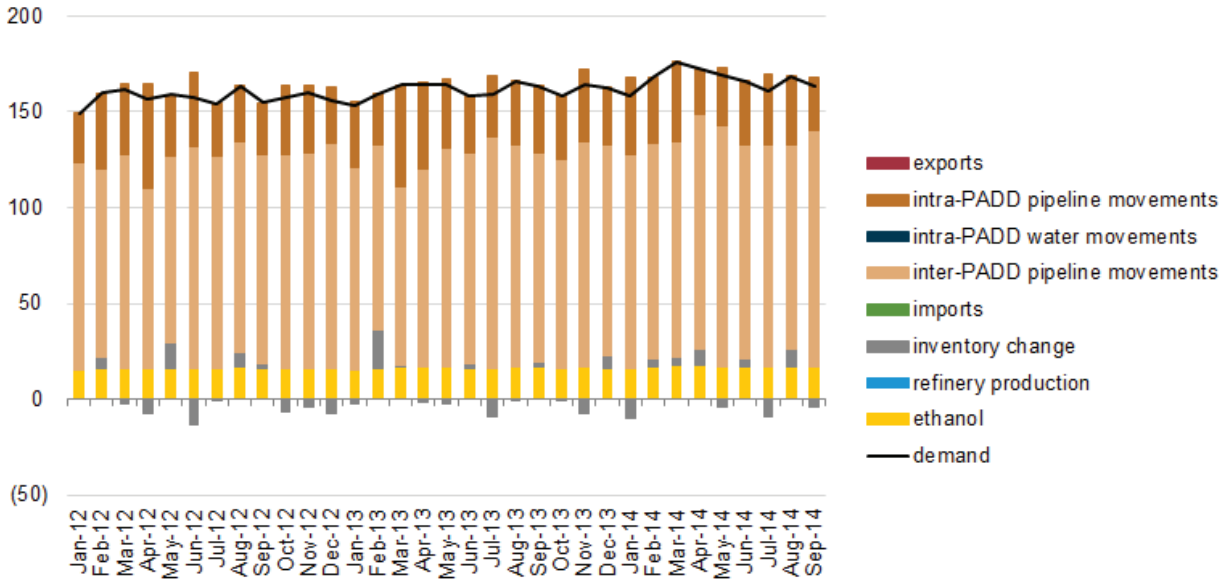
The CBG program has two key elements: a summer cleaner-burning fuel blend with a low Reid Vapor Pressure (RVP) to reduce ozone levels and a winter clean-burning fuel blend with a minimum oxygenate

content to reduce carbon monoxide levels. Winter CBG must also meet the specifications for CARB Phase 2 reformulated gasoline. Summer CBG must either meet the winter CARB Phase 2 specifications or meet specifications patterned after the federal Phase 2 reformulated gasoline (RFG) program. As a result, much of the gasoline required in Arizona is similar to CARB or federal RFG, which provides supply advantages. The petroleum component of gasoline blended specifically to meet Arizona gasoline specifications is Arizona Blendstock for Oxygenate Blending (AZBOB).

Arizona's gasoline demand is primarily supplied by shipments from refineries in El Paso, Texas and other refineries on the Gulf Coast, with additional volumes sourced from refineries in Southern California. The same supply pattern exists for jet fuel, with most of the region's jet fuel supplies sourced from the Gulf Coast. However, Arizona's distillate demand is supplied mostly from Southern California refineries, representing that region's relative net length in distillate supplies.

Figure 28. Arizona motor gasoline supply/demand balance

thousand barrels per day



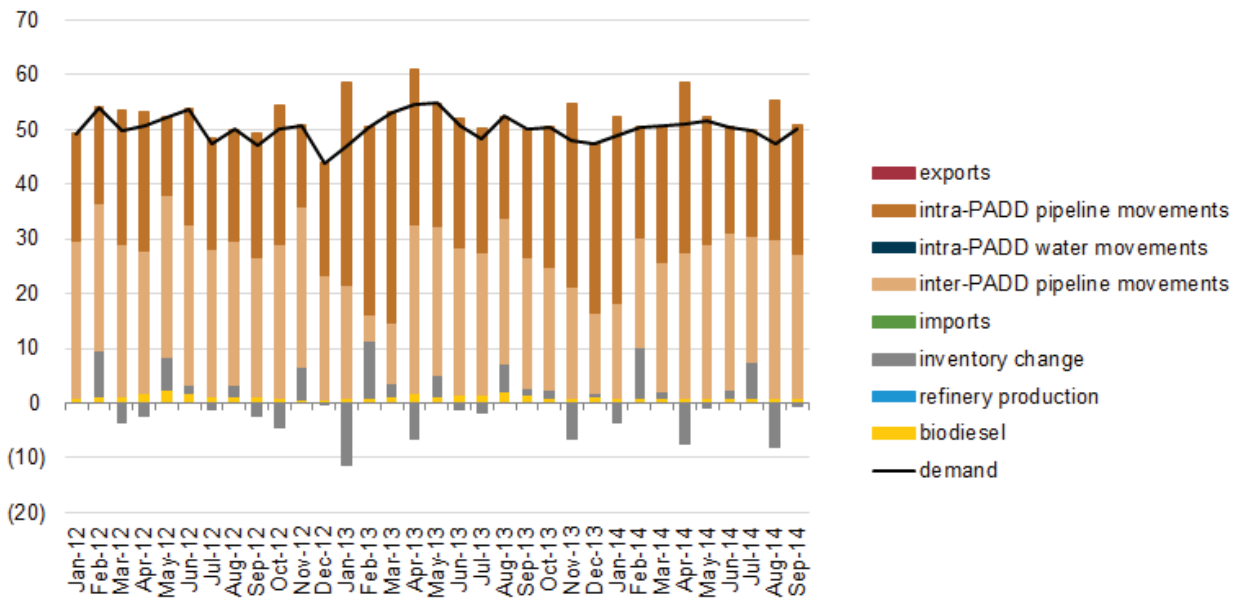
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

In 2013, Arizona region consumed 50,600 b/d of distillate fuel. Supply from Southern California averaged 28,200 b/d (56% of demand), and supply from Texas and New Mexico averaged 21,300 b/d (42% of demand). Biodiesel supplied about 3% of Arizona diesel fuel demand in 2013. Arizona requires ultra-low sulfur diesel, the specifications for which are less restrictive than CARB diesel.

Figure 29. Arizona distillate supply/demand balance

thousand barrels per day



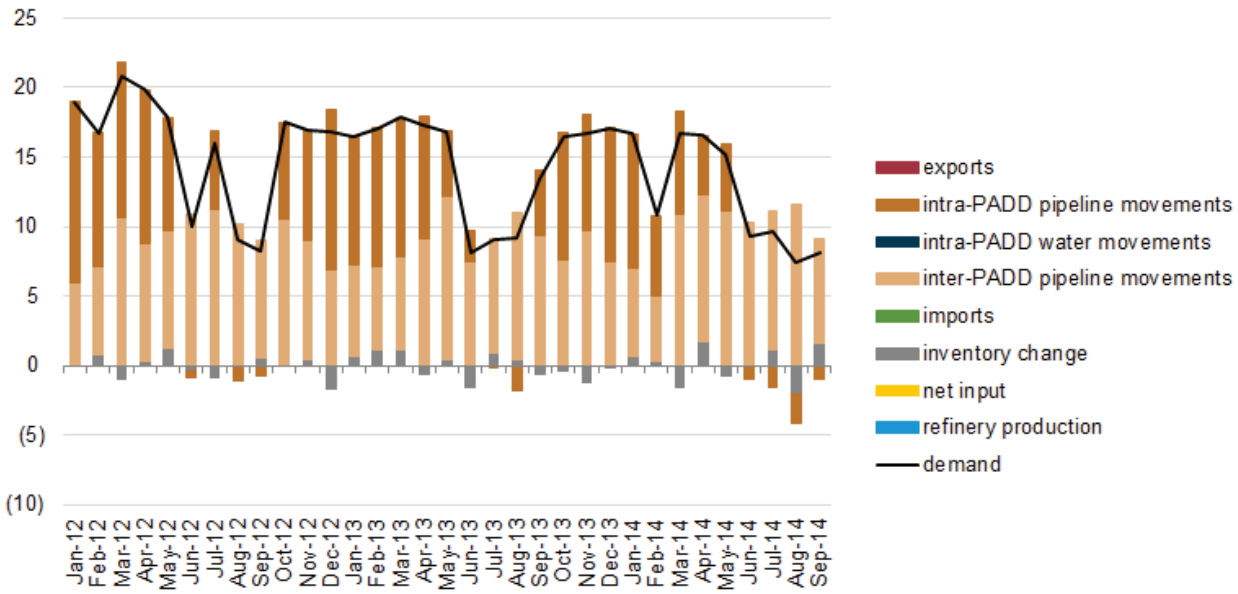
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

In 2013, Arizona consumed 14,600 b/d[16] of jet fuel, most of which was supplied from Texas and New Mexico. Jet fuel demand is principally at the Phoenix Sky Harbor International Airport and the Tucson International Airport, both of which are supplied from the Kinder Morgan pipeline systems.

Figure 30. Arizona jet fuel supply/demand balance

thousand barrels per day



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

Motor gasoline sold in Arizona is blended with ethanol to an average level of 10%, driven by the federal RFS program and also by the EPA's State Winter Oxygenated Fuel program that requires minimum oxygenate levels to reduce carbon monoxide emissions. The winter oxygenated fuel season is generally October through February or March. Arizona has one ethanol production facility, Pinal Energy, which restarted in March 2014 after having been idle for 18 months. Arizona also has biodiesel production capacity.

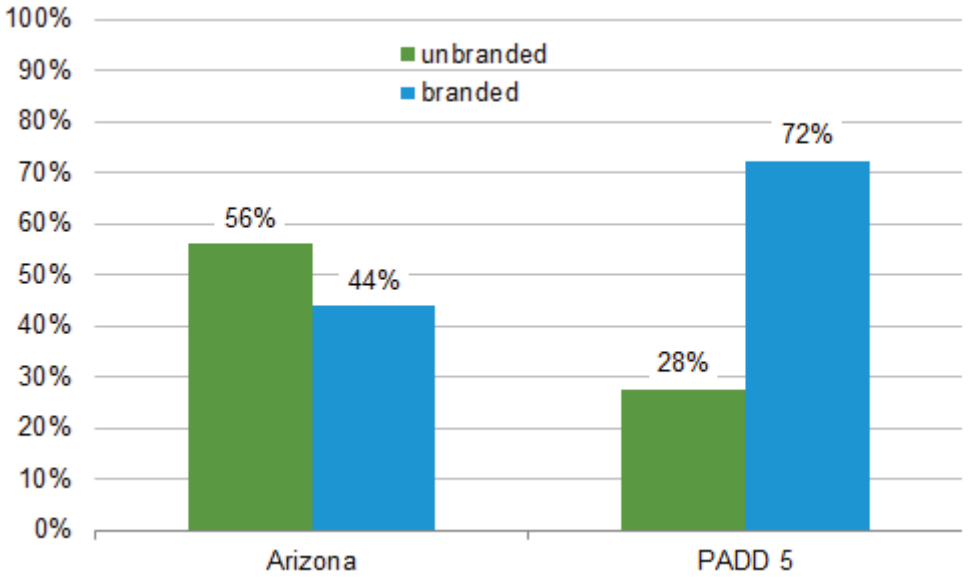
[16] Non-EIA sources of data estimate Arizona jet fuel consumption at higher levels.

Retail market

There are about 23 branded and unbranded fuels retailers operating in Arizona and most, 56%, of the retail outlets are unbranded meaning they are unaffiliated with a major oil company brand, although they may purchase product from a major oil company and market that product under a different brand. Major retail brands in Arizona include Chevron, Circle K, Fry's, Quik Trip, Shell, and Valero.

Figure 31. Arizona retail market structure

percent of retail outlets



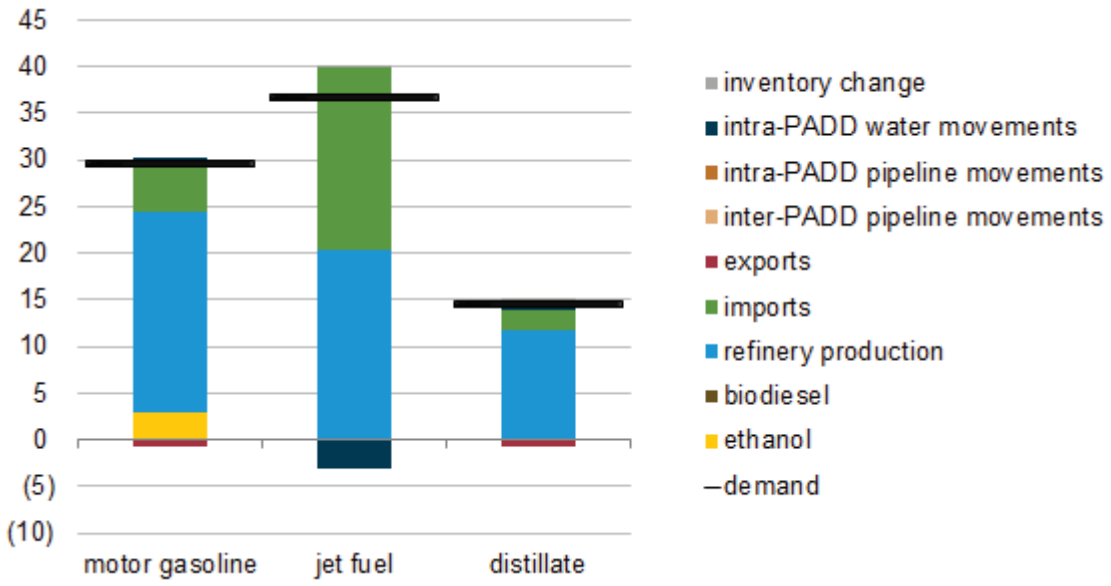
Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

Hawaii

Hawaii is remote and isolated from other PADD 5 regional markets and other PADDs. Hawaii relies primarily on in-region refinery production and imports. In 2013, refineries in Hawaii produced 21,500 b/d of motor gasoline, 20,300 b/d of jet fuel, and 11,800 b/d of diesel fuel sufficient to meet 72% of motor gasoline demand, 55% of jet fuel demand, and 81% of distillate fuel demand. Refinery production was supplemented with motor gasoline imports of 5,400 b/d, jet fuel imports of 19,700 b/d, and distillate imports of 2,200 b/d. Hawaii was also supplied with small volumes of motor gasoline and diesel fuel from other PADDs and a small volume of diesel fuel from other PADD 5 regional markets.

The state's island geography supports air travel, and as a result, Hawaii's jet fuel demand, which averaged 36,700 b/d in 2013, is higher than demand for both motor gasoline and diesel fuel. Hawaii's jet fuel demand accounted for 8% of PADD 5 demand in 2013, compared with 2% of motor gasoline and 3% of diesel fuel demand. The state's diesel demand is boosted by demand from the electric power sector and U.S. Navy demand for marine fuels.

Figure 32. Hawaii 2013 supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Supply and logistics

There are two operating refineries in Hawaii with a combined atmospheric crude distillation unit capacity of 147,500 barrels per calendar day (b/cd). The Chevron Barbers Point refinery with capacity of 54,000 b/cd refines light and very low-sulfur-content crude oil into motor gasoline, distillate fuel, and jet fuel. The Par Petroleum Ewa Beach refinery, doing business as Hawaii Independent Energy, has atmospheric crude distillation capacity of 93,500 b/cd, and produces mostly jet and diesel fuels. The Ewa Beach refinery processes a mix of sweet and moderately heavy crude oils, including imports and oil from

the Alaska North Slope. In addition to transportation fuels, Hawaiian refineries produce significant quantities of heavy fuels used in electric power generation.

Table 7. Hawaii refineries

Company	Location	Atmospheric Crude Distillation Unit (ACDU) capacity b/cd	Markets served
Chevron USA	Honolulu (Barbers Point)	54,000	Hawaii
Par Petroleum dba Hawaii Independent Energy	Ewa Beach (Kapolei)	93,500	Hawaii

Source: Stillwater Associates analysis of EIA data

In the first quarter of 2013, the refinery at Ewa Beach (then owned and operated by Tesoro Corporation) was idled and did not operate for several months. As a result, 2013 data on refinery transportation fuels supply are atypical for Hawaiian petroleum product markets. Par Petroleum purchased the Tesoro refinery and restarted it in the second quarter of 2013. The refinery is now doing business as Hawaii Independent Energy. With the restart, supply is now more consistent with historical patterns.

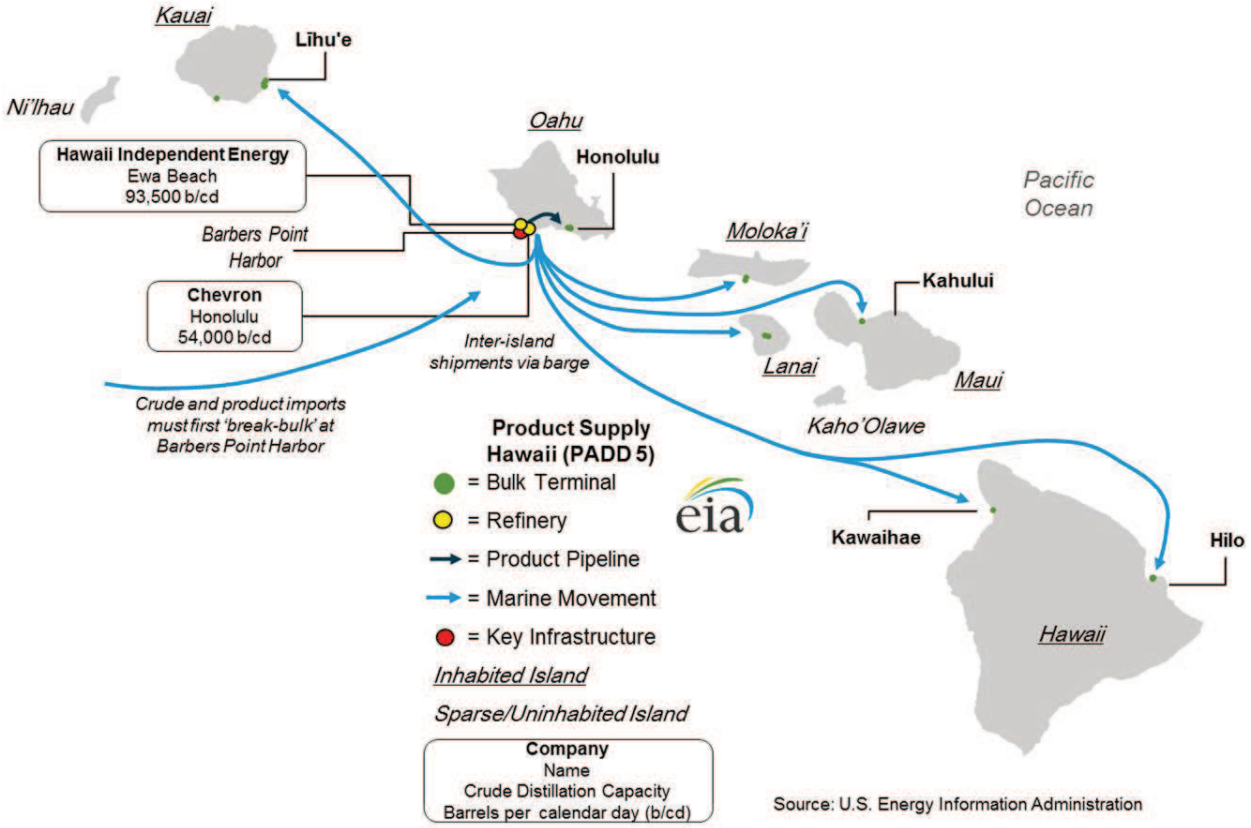
In 2013, refineries in Hawaii produced 21,500 b/d of motor gasoline, 20,300 b/d of jet fuel, and 11,800 b/d of diesel fuel sufficient to meet 72% of motor gasoline demand (81% when blended with ethanol), 55% of jet fuel demand, and 75% of diesel fuel demand. Refinery production was supplemented with motor gasoline imports of 5,400 b/d, jet fuel imports of 19,700 b/d, and diesel imports of 2,200 b/d. Hawaii was also supplied with small volumes of motor gasoline and diesel fuel from other PADDs and supplied a small volume of diesel fuel from other PADD 5 regional markets.

Product from the refineries on Oahu moves by pipeline to supply storage and distribution terminals on Oahu and by marine vessel from the Barbers Point Harbor to terminals on the islands of Maui, Kauai, and Hawaii. Product that arrives in Hawaii by marine vessel from other U.S. regions is also processed through the Barbers Point Harbor where large seagoing marine vessels can be accommodated. Large cargoes are offloaded, and then smaller volumes are shipped by barge to the storage and distribution terminals on the other islands. There are 14 storage and distribution terminals outside the Honolulu area, many of which are small.

Product is also shipped to Honolulu International Airport by pipeline across Pearl Harbor and by truck from Honolulu area terminals.

The two refineries on Oahu and the Barbers Point port facilities and associated barge fleet are critical to Hawaii transportation fuels supply.

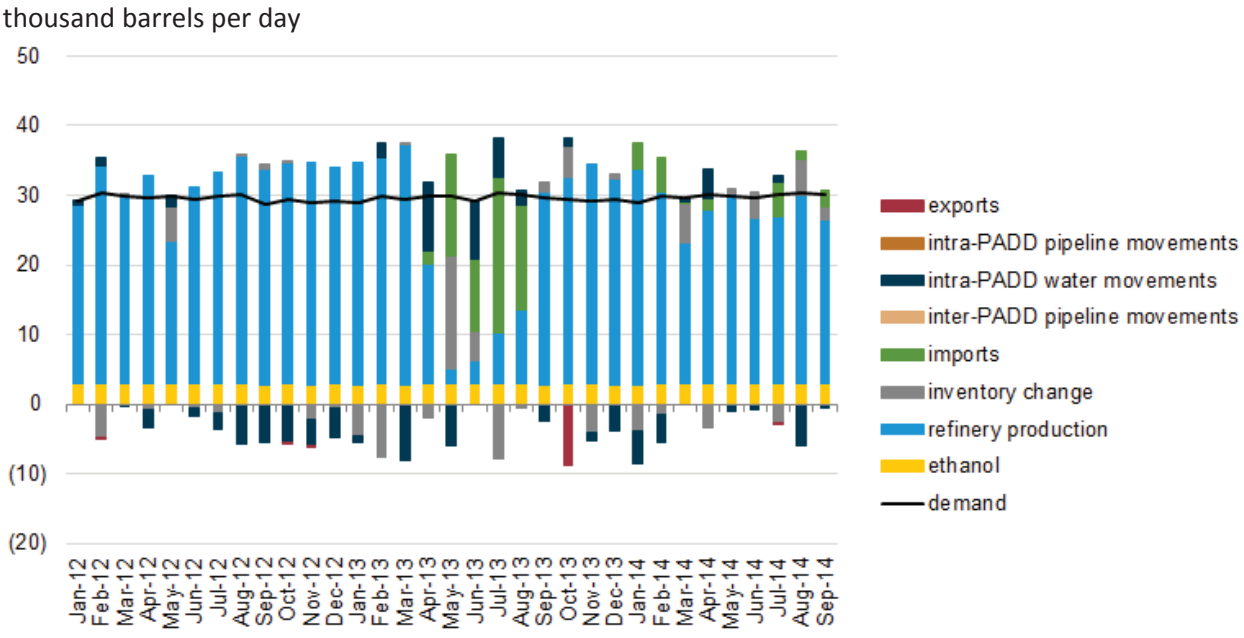
Figure 33. Hawaii refineries and petroleum product flows



Motor gasoline supply/demand

Hawaii is typically a tightly balanced market for motor gasoline. In 2012, in-region refinery production when blended with ethanol was sufficient to supply 99% of motor gasoline demand. On average in 2013, in-region refinery production in Hawaii was sufficient to supply only 72% of demand (81% when blended with ethanol). Imports and receipts from other PADDs supplied the balance. After the restart of the closed refinery, EIA data indicate that balances are more consistent with historical levels.

Figure 34. Hawaii gasoline supply/demand balance



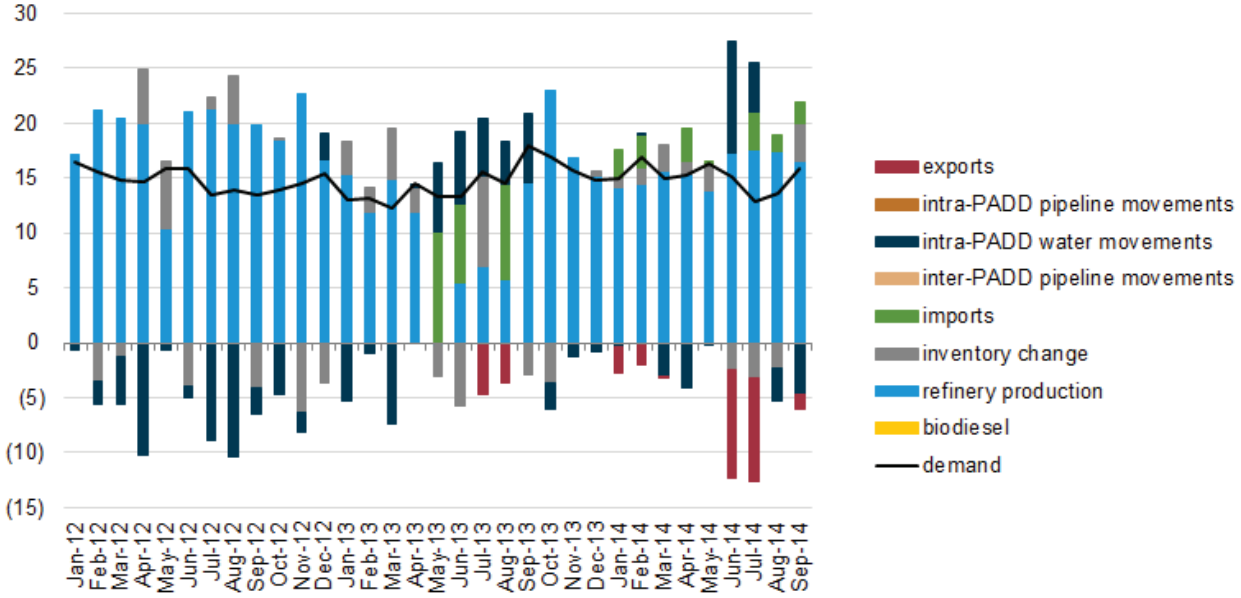
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

Refineries in Hawaii typically produce more distillate fuel than is consumed locally. In 2012, in-region refineries produced 129% of average distillate demand and in the first nine months of 2014 produced 104% of average demand. However, refineries in Hawaii are configured to produce some diesel fuel to meet power generation demand. The refineries also lack de-sulfurization capacity. This creates an imbalance between the distillate fuels produced in Hawaii, with excess supplies of heavy higher-sulfur diesel fuel and a shortage of lower-sulfur distillate fuels like ULSD. As a result, Hawaii exports or ships to other parts of PADD 5 heavier distillate fuels, and either imports ULSD or receives it from other PADD 5 regional markets. The lack of desulfurization capacity at Hawaiian refineries limits crude slate flexibility and favors crude oil with very low sulfur content.

Figure 35. Hawaii distillate fuel supply/demand balance

thousand barrels per day

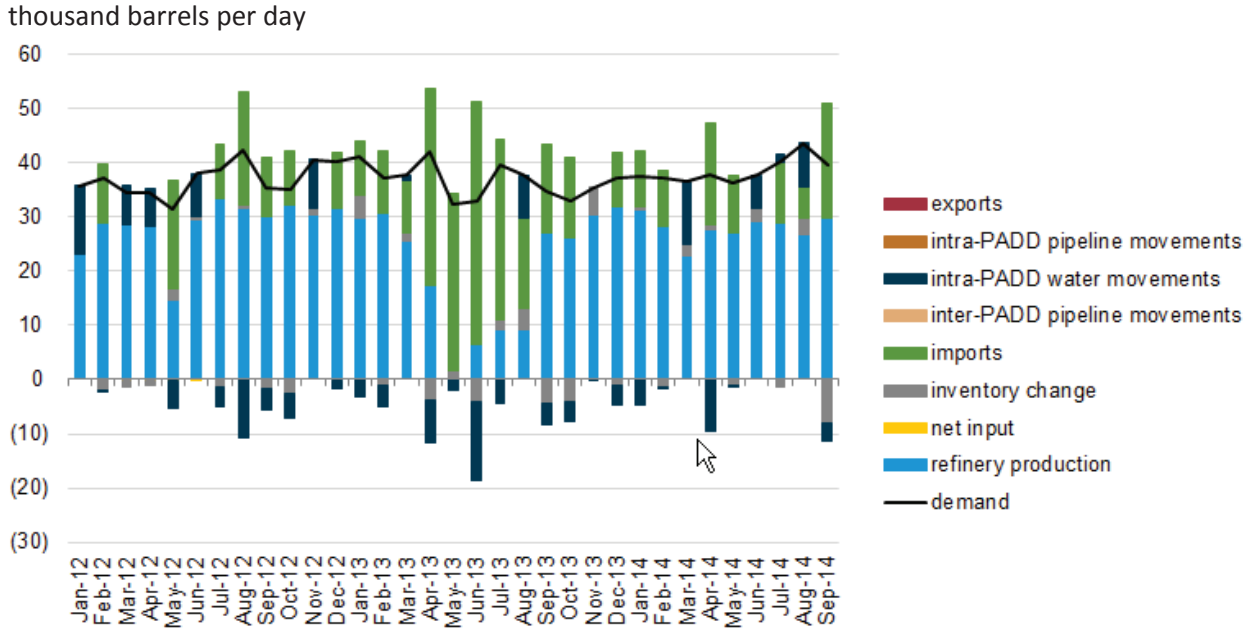


Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

Hawaii consumes more jet fuel than motor gasoline or diesel fuel. As in-region refineries cannot produce sufficient quantities of jet fuel to meet demand, Hawaii imports substantial volumes of jet fuel. In 2013, Hawaii imported 19,700 b/d of jet fuel (54% of demand) and in 2012 the state imported jet fuel to meet 21% of demand. Jet fuel is occasionally transferred to Hawaii from other regions of PADD 5.

Figure 36. Hawaii jet fuel supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

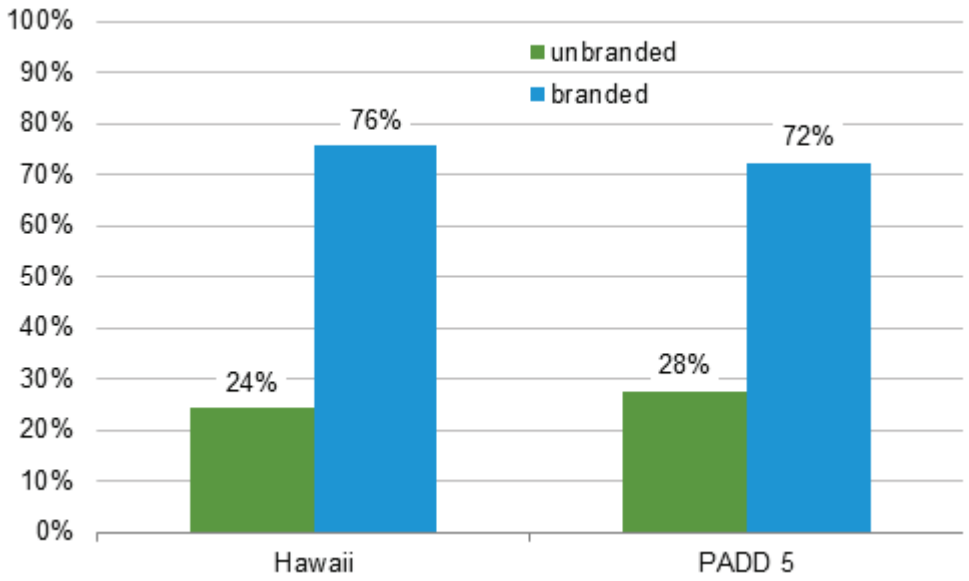
Transportation fuels sold in Hawaii must comply with the federal Renewable Fuels Standard (RFS) that mandates transportation fuels sold in the United States contain a minimum volume of renewable fuels. However, Hawaii recently passed legislation to eliminate the mandate to blend ethanol into gasoline. It is unclear what practical impact the legislation will have because producers will still be required to blend renewable fuel into gasoline and diesel under the federal Renewable Fuel Standard program. Ethanol is currently shipped to Hawaii from the other regional markets in PADD 5 or from Brazil. Ethanol shipped from the West Coast typically originates in the Midwest and moves to the West Coast by rail. Plans to produce ethanol in Hawaii using locally grown feedstocks have been slow to materialize despite state incentives.

Retail market

There are about nine branded and unbranded retailers of transportation fuels in Hawaii, and 76% of retail outlets sell branded fuels. Chevron, 76, Aloha, Tesoro, and Shell are among the major retail brands in Hawaii.

Figure 37. Hawaii retail market structure

percent of retail outlets



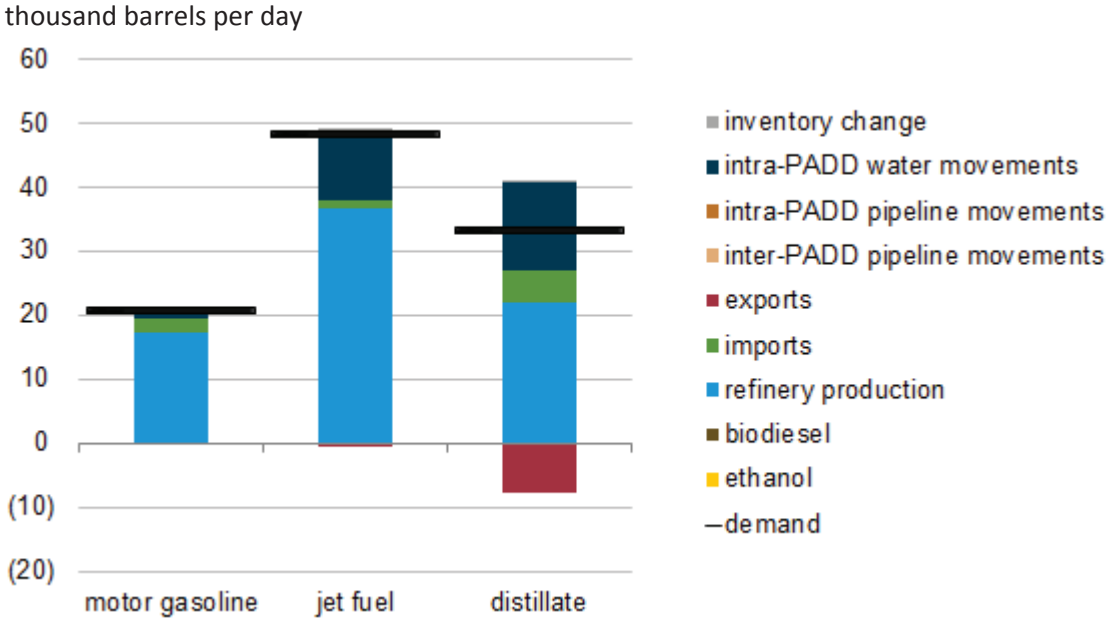
Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

Alaska

Alaska has the lowest population of all PADD 5 regions, and as a result, Alaska's demand for motor gasoline accounts for a small percentage of total PADD demand. However, the region's remoteness and wide geographic expanse make air travel essential, and Alaska's demand for jet fuel is higher than for motor gasoline. The region's distillate fuel demand is supported by resource extraction activities and oil production in the north. In 2013, Alaska's demand for motor gasoline was 20,800 b/d, less than 2% of total PADD 5 demand; jet fuel demand was 48,400 b/d, 11% of PADD 5 demand; and diesel fuel demand was 33,400 b/d, 7% of PADD 5 demand.

The region is supplied primarily by in-region refinery production, by production from refineries in other regions of PADD 5 that is delivered by marine vessel from Washington and California, and by imports.

Figure 38. Alaska 2013 supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Supply and logistics

There are five operating refineries in Alaska with combined atmospheric crude distillation unit capacity of 165,200 barrels per calendar day (b/cd). A sixth refinery, Flint Hills Resources North Pole refinery, with 126,535 b/cd crude distillation capacity, was closed in 2014 and is being dismantled and converted to a storage and distribution terminal.

The operating refineries are dispersed across the state. On the North Slope, two of the three major crude oil producers, BP and ConocoPhillips, operate small distillation-only refineries that process Alaska North Slope (ANS) crude oil to produce artic diesel fuel for production operations. The refineries inject unsold distillation products back into the Trans-Alaska Pipeline System (TAPS). Petro Star also operates

two distillation-only refineries, one in North Pole in central Alaska and the other in Valdez in southern Alaska. Both of these facilities blend unsold distillation products back into TAPS.

Tesoro operates the largest and most complex refinery in Alaska at Kenai. The Tesoro refinery produces a wider range of transportation fuels, including motor gasoline, jet fuel, and diesel fuel. The refinery also produces asphalt.

Table 8. Alaska refineries

Company	Location	Atmospheric Crude Distillation Unit (ACDU) capacity b/cd	Markets served
Tesoro	Kenai	65,000	Anchorage
Petro Star	Valdez	55,000	South Alaska/Islands
Petro Star	North Pole	19,700	Fairbanks/Central Alaska
Conoco Phillips	Prudhoe Bay	15,000	Conoco Phillips Production Operations
BP	Prudhoe Bay	10,500	BP Production Operations

Source: Stillwater Associates analysis of EIA data

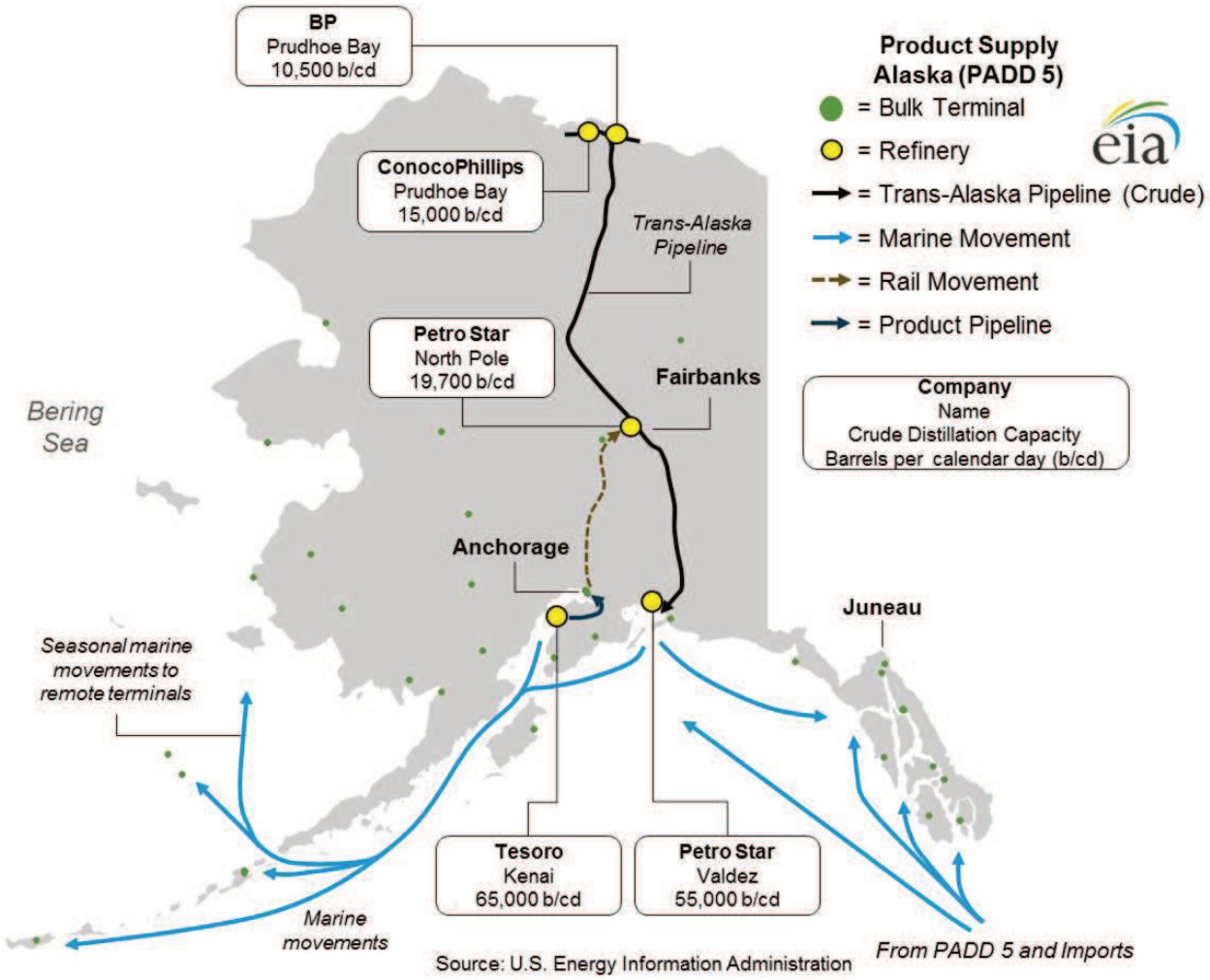
On an annual average basis, the refineries in Alaska supply 83% of motor gasoline demand, 76% of jet fuel demand, and 66% of diesel fuel demand. However, Alaska's seasonal weather patterns result in seasonal differences in consumption. Supply/demand balances and supply patterns vary across the year. Refinery supply is supplemented with receipts from other PADD 5 regions and imports. Product is regularly supplied to southeastern Alaska by marine vessel from Washington and California. Alaska also exports a small amount of fuel to Canada and Asia.

Shipment of product within Alaska is by pipeline between Kenai and Anchorage, by rail between Anchorage and Fairbanks, and by marine vessel. The Anchorage-to-Fairbanks rail line and the pipeline to Anchorage are critical to the supply chain.

There are 42 small storage/distribution terminals outside the Anchorage area that serve isolated areas. Deliveries to some locations are seasonal, occurring only during the summer and fall when barge movements are possible. In Southeast Alaska, where there are few roads, fuels are supplied by barge from the U.S. West Coast and Canada.

Jet fuel is delivered to the Ted Stevens International Airport via both pipeline and trucks from Anchorage-area terminals.

Figure 39. Alaska refineries and petroleum product flows

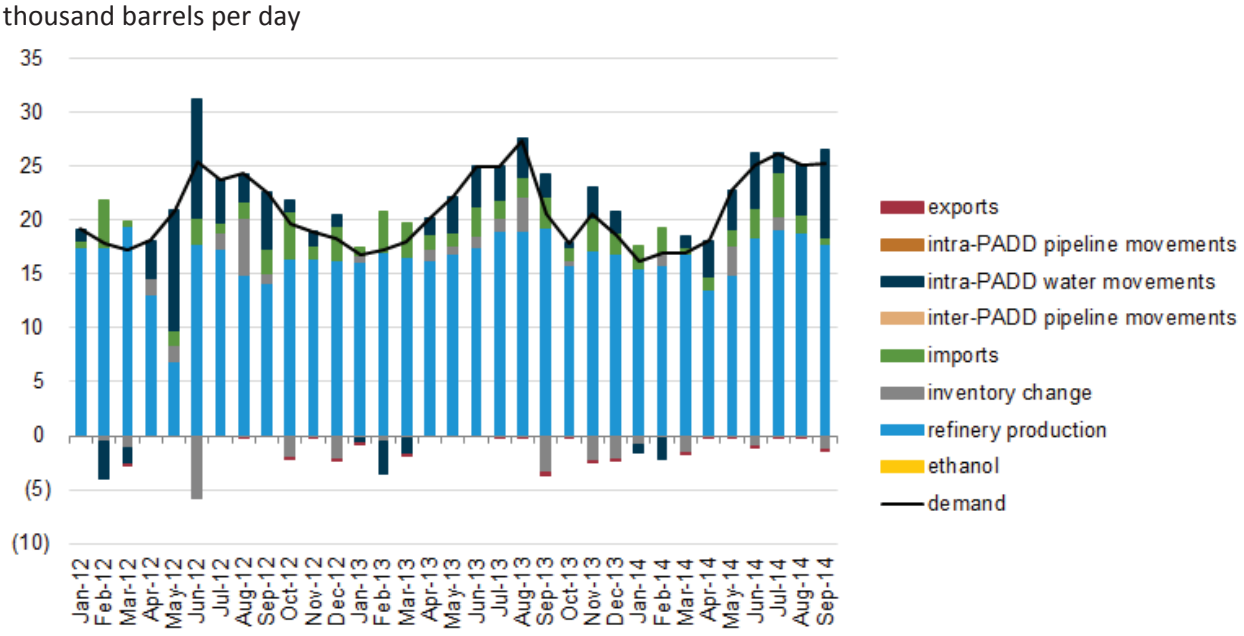


Motor gasoline supply/demand

Motor gasoline demand in Alaska is highly seasonal. Demand in the peak summer months is significantly higher than in the winter months. In the winter months, in-region refinery production of gasoline is almost sufficient to meet demand; during the summer, a combination of imports and marine deliveries from other PADD 5 regions supplements in-region refinery production. In 2013, Alaska motor gasoline demand averaged 20,800 b/d. In January 2013, demand was about 16,800 b/d and in July demand was 25,000 b/d.

Alaska does not require the blending of ethanol with motor gasoline so ethanol does not represent the typical 9%–10% of motor gasoline as it does in other regions of PADD 5.

Figure 40. Alaska motor gasoline supply/demand balance



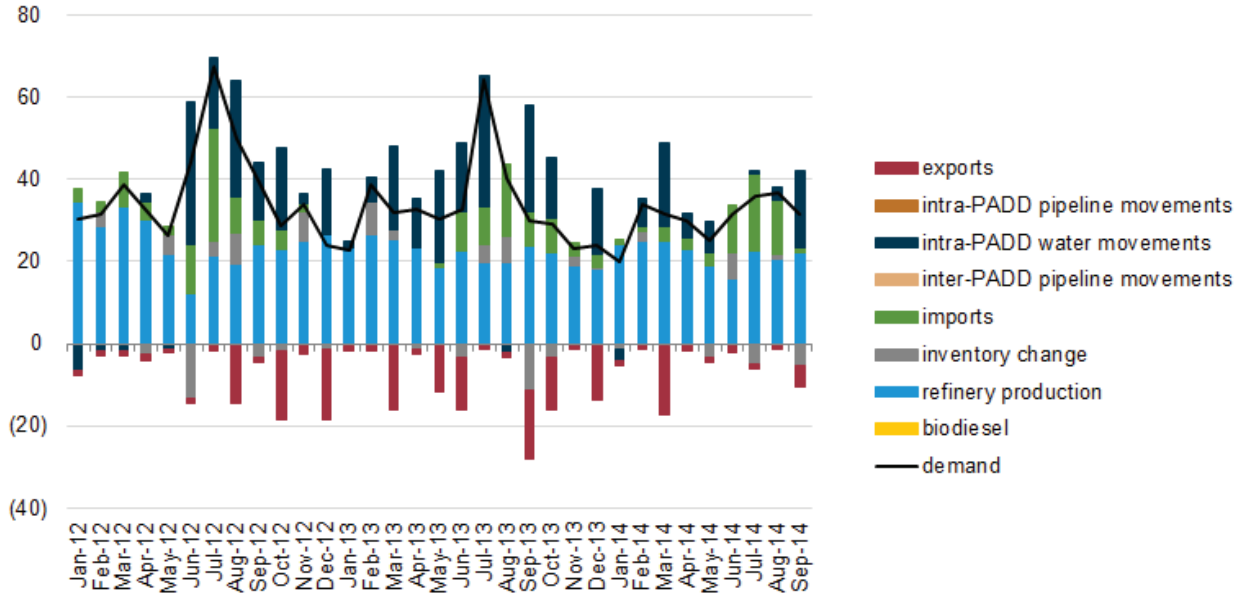
Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Distillate fuel supply/demand

Alaskan distillate demand, 33,400 b/d on average in 2013, is supplied mostly by in-region refinery production (66%), imports (15%), and marine movements from other regions (41%). Some of the refineries in Alaska's North Slope produce off-road diesel fuels for use in oil and natural gas exploration and production activities. Diesel is also exported from Alaska to Canada and Asia.

Figure 41. Alaska distillate fuel supply/demand balance

thousand barrels per day

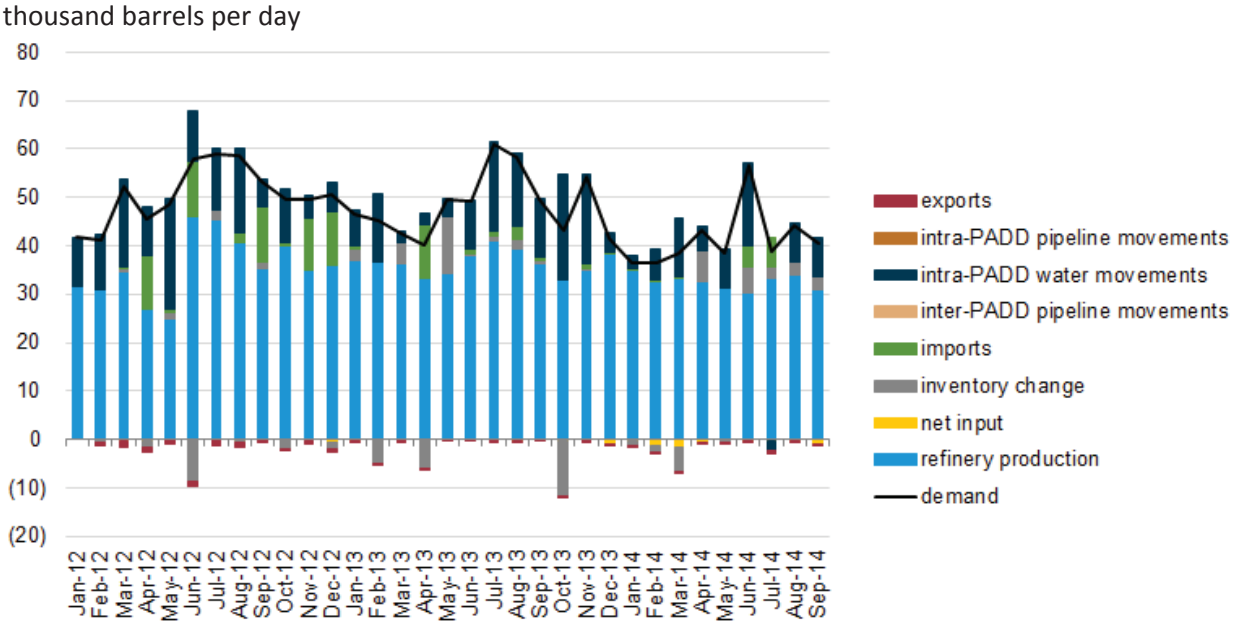


Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Jet fuel supply/demand

Jet fuel is a critical transportation fuel in Alaska. With vast distances to cover across rugged terrain, aviation is often the only way to access many parts of the state. Alaska's jet fuel consumption of 48,400 b/d on average in 2013 accounts for 11% of PADD 5 jet fuel demand. Jet fuel demand is typically higher in summer months than in winter. In-region refineries produced jet fuel sufficient to supply 76% of average demand in 2013. Imports of 1,500 b/d and receipts of jet fuel from other PADD 5 regions, Washington and California, supplied the balance.

Figure 42. Alaska jet fuel supply/demand balance



Note: All movements are on a net basis.
Source: Stillwater Associates analysis of EIA data

Renewable fuels and biofuels supply/demand

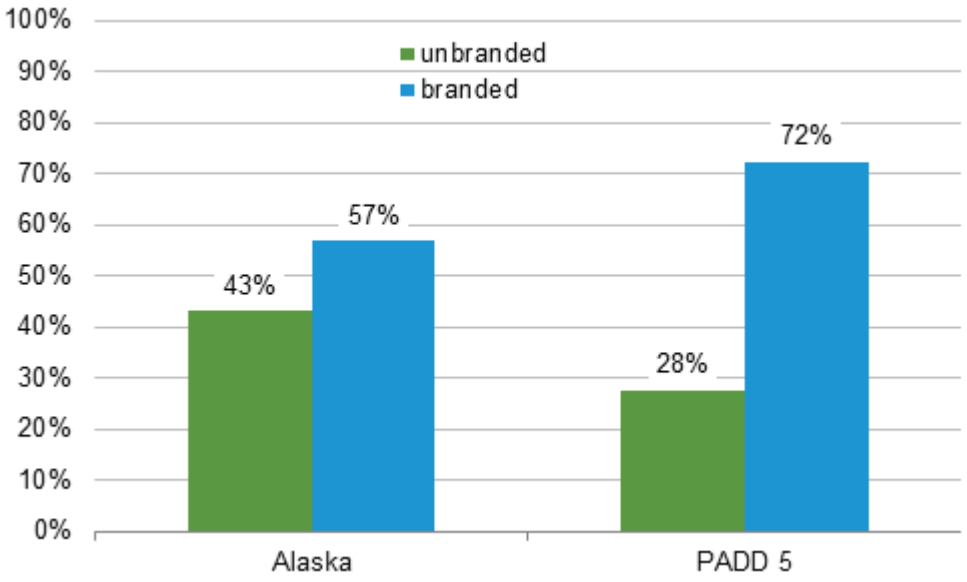
There is minimal biofuels demand in Alaska. There is no requirement to blend ethanol into motor gasoline. EIA data indicate that there is one biodiesel production facility in the state as of April 2015.

Retail market

There are 9 branded and unbranded retailers with approximately 165 retail outlets in Alaska. Most of the retail locations (57%) are branded. Major retail brands include Holiday, Tesoro, Chevron, and Shell.

Figure 43. Alaska retail market structure

percent of retail outlets



Source: Stillwater Associates analysis of Oil Price Information Service (OPIS) data for the week of December 31, 2014
Note: OPIS data are survey rather than census data, and survey data include transactions from large commercial trucking fleet customers using company credit cards and not from cash or credit card sales to the general public.

VALERO
REFINING COMPANY-CALIFORNIA
3400 East Second Street, Benicia, CA 94510-1097

Certified # 7011 1150 0001 6525 8052

September 25, 2015

Proposed Petroleum Refining Emissions Limits
and Risk Thresholds Rule
Regulation 12, Rule 16, Comments from Valero

Mr. Eric Stevenson
Permit Services Division
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Dear Mr. Stevenson:

Valero Refining Company – California (Valero) appreciates this opportunity to provide comments regarding the Bay Area Air Quality Management District's (BAAQMD) proposed regulation on the Petroleum Refining Emissions Limits and Risk Thresholds Rule, as posted for comment on September 11, 2015. Valero's Benicia refinery, located within the BAAQMD jurisdiction, has a throughput capacity of over 170,000 barrels per day, providing transportation fuels and high quality employment opportunities in the Bay Area. The Benicia refinery, as well as the rest of the refining industry in the Bay Area, will be significantly impacted by the proposal referenced above.

Valero supports the comments of the California Council for Environmental and Economic Balance (CCEEB) and incorporates their comments herein. We offer below further comments and discussion in support of our position on the current draft, and we also attach and reference the Valero comment letter submitted on March 27, 2015, pertaining to the previously proposed draft of this rule. Despite the rule being completely rewritten and the very short comment period of two weeks, Valero provides comments on overall concepts, refers to its previous comment letter to address outstanding issues from the previous draft rule, and provides more developed comments on new issues that have arisen in the latest version of the rule.

1. This Regulation is Not Needed

The District has not shown that there is any need or legal authority to support the proposed rule. The stated purpose of this rule is to identify the cause of, and to mitigate, any significant emission increases from petroleum refineries. The District has failed to demonstrate why its

current permitting process does not meet this objective. The District has not identified a problem the rule would alleviate and has not identified how it will help obtain air quality standards. Therefore, this rule is not cost effective. Furthermore, as part of the Environmental Protection Agency's (EPA) proposed Risk and Technology Rule, the EPA modeling of all refineries in the United States found no unacceptable risks from air toxics. The District must document why the EPA modeling and resultant findings are not scientifically sound to the extent that the District must deploy this proposed rule to reduce risks.

Proposed Regulation 12-16 impedes Valero's ability to run permitted sources and needs to be eliminated from the rulemaking process. Though this regulation is entitled "Petroleum Refining Emissions Limits and Risk Thresholds," it is in actuality a means to cap refinery emissions below the levels legally permitted through the District's existing regulatory process. Once permitting is triggered under this rule, the emissions reduction plan (ERP) will require that every source in the refinery be considered for emissions reductions. The requirement to reduce emissions below permitted levels is contrary to BAAQMD and Federal New Source Review (NSR) requirements, circumvents other District permitting and offset rules (Regulations 2-1, 2-2, and 2-5), renders the District's air permitting program fundamentally inconsistent with the Federal New Source Review program, and is not needed to monitor and control emissions and public health impacts. Furthermore, Proposed Regulation 12-16 disregards all health and environmental analyses that go into establishing the refinery's current permitted emission limits in favor of a program that arbitrarily prevents increases above historical actual emissions. The District has failed to explain why these analyses are insufficient.

According to the California Office of Environmental Health Hazard Assessment (OEHHA), there has been approximately an 80 percent reduction in cancer risk based on monitored air toxics concentrations since 1990 at sites across California. The health effects on people living closest to air toxics sources have also been reduced due to changes in equipment and processes, and emission reductions occurred despite 8 million more residents and 8 million more cars on the road. OEHHA attributes these improvements to local Air Districts adopting aggressive toxic reduction rules as well as implementing statewide measures requiring cleaner fuels, improved technology, or changes in operating practices to address toxics. Sources of air toxics in California typically have the highest level of technological control installed to reduce emissions, as required by State and local regulations, and industry has invested in cleaner equipment and operations.

Proposed Regulation 12-16 is duplicative of other District rules which have contributed to the improvements noted above. The District currently regulates toxics pursuant to BAAQMD Regulation 2-5, "New Source Review of Toxic Air Contaminants", the Community Air Risk Evaluation (CARE) Program, Federal NESHAPs/MACT regulations, and California Air Resources Board's (CARB) Airborne Toxic Control Measures. If the BAAQMD maintains that additional regulations are needed to ensure toxic emissions do not pose an unacceptable health risk to the residents or nearby communities, they are, in effect, stating that current regulations are ineffective, which is not supported by OEHHA's conclusions. The BAAQMD has not demonstrated why multiple, existing toxic control regulations are inadequate to protect the public.

The District Workshop Report includes a similar comment regarding flares under Regulation 12-16; i.e., because flares are already covered under Regulations 12-11 and 12-12, they are exempted from these proposed rules. If the District is concerned with avoiding confusion and conflict with existing regulations, as stated in the Workshop Report, proposed Regulation12-16 should be abandoned.

Proposed Regulation 12-16 would deprive Valero and other refiners of the flexibility to operate within legally obtained and demonstrably protective emission limits established through previous permitting processes, many of which addressed the very concerns cited as the basis for this rulemaking by requiring the installation of pollution control technology that cost hundreds of millions of dollars. In defiance of California's vested rights doctrine, this unreasonable and arbitrary constraint of operational flexibility unfairly reduces the return on previous investments in pollution control technology. This rule will disincentivize future investment in Bay Area refineries. In the absence of any demonstrated harm or threat to human health and the environment, the District has not adequately considered the potential impacts of this rule, nor has it shown that it has the underlying legal authority to establish a regulation that would have such potentially far-reaching economic impacts.

California law requires regulations to be "reasonably necessary" to survive judicial review [1951 Cal. Stat. 479, §10. The Office of Administrative Law's (OAL) website states that one of its key functions it to ensure that a rule is necessary. California Government Code section 11349 defines 'necessity':

> "Necessity" means the record of the rulemaking proceeding demonstrates by substantial evidence the need for a regulation to effectuate the purpose of the statute, court decision, or other provision of law that the regulation implements, interprets, or makes specific, taking into account the totality of the record. For purposes of this standard, evidence includes, but is not limited to, facts, studies, and expert opinion. [All emphases are added.]

Section 11346.2 (b) provides that each regulation must also include the following in the initial statement of reasons for the action:

> A statement of the specific purpose of each adoption, amendment, or repeal, the problem the agency intends to address, and the rationale for the determination by the agency that each adoption, amendment, or repeal is reasonably necessary to carry out the purpose and address the problem for which it is proposed. The statement shall enumerate the benefits anticipated from the regulatory action, including the benefits or goals provided in the authorizing statute. [All emphases are added.]

Section 11350 provides that a regulation may be declared invalid by a court if:

> The agency's determination that the regulation is reasonably necessary to effectuate the purpose of the statute, court decision, or other provision of law that is being implemented, interpreted, or made specific by the regulation is not supported by substantial evidence. [All emphases are added.]

The Interim Staff Report does not provide substantial evidence that the action is reasonably necessary. The statement of necessity does not describe a problem that is not already addressed by numerous other rules. The regulation is not designed to address the ostensibly described problem. Finally, the District's reneging on NSR permits to industry constitutes an environmental taking and undermines faith in the District's regulatory authority.

2. Inappropriateness of Proposed Regulation of NAAQS

a. NAAQS Compliance Modeling or Monitoring Does Not Apply to Individual Existing Sources In Attainment Areas

Proposed Rule 12-16-406 mandates refineries to complete dispersion modeling or install new monitoring to demonstrate "compliance with the SO_2 or $PM_{2.5}$ NAAQS". The federal Clean Air Act and California air law and regulations mandate that significant new sources and new emissions from existing sources demonstrate through modeling that the relevant NAAQS or increments for the NAAQS are not exceeded. Where an area is classified as attainment for a NAAQS, neither the federal Clean Air Act nor state law or regulations may mandate NAAQS compliance demonstrations for existing permitted sources. Where an area is designated nonattainment for a pollutant, the State is obligated to evaluate all existing sources for potential contribution to the nonattainment and to determine reasonable controls on sources determined to contribute to the nonattainment. Neither the federal Clean Air Act nor California law allow imposing new obligations to demonstrate NAAQS compliance for permitted existing sources without following the New Source Review program for emission increases or the nonattainment SIP development process. The NAAQS have never been standards directly applicable to individual existing sources.

The District is obligated to follow appropriate rulemaking procedures to address known air quality problems. In this case, the District has not identified an air quality problem and is circumventing the New Source Review program, the valid permits issued to the refineries, and the nonattainment SIP development process. The refineries in the District complied with applicable legal requirements when each source was built or installed and those requirements have been incorporated into the current air permits. To mandate demonstrating NAAQS compliance for the existing permit limits and mandate emission reductions until modeling demonstrates that the permit limits comply with current NAAQS violates the due process and legal doctrines against retroactive application of new standards to existing sources absent a compelling public interest.

b. Modeling Refinery-wide Potential Emissions Is Inconsistent with Air Regulation Principles, Due Process and Current Modeling Guidelines and Practice

When sources must model new emission sources or new emissions, the modeling takes into account actual emissions and background emissions for existing sources and potential emissions levels from new or modified sources. The District's new requirement would have refineries modeling maximum potential for its sources as if the sources were all new emissions. Among the reasons that air regulation has treated existing sources differently from new sources are fundamental principles of due process and certainty in permitting as well as the recognition that existing sources can demonstrate actual and normal operations and emissions as compared to new or modified sources. The District violates these principles by mandating modeling for existing sources.

c. Modeling Refinery-wide Potential Emissions Against Current NAAQS Violates Due Process Because New NAAQS Were Issued After Refinery Emission Limits Were Issued

The refineries are subject to many types of pollution control standards that impose emission limits and conditions on all refinery sources. However, new NAAQS have come into effect subsequent to some of those limits. The Clean Air Act and California law and regulations set forth the process for imposing new standards on existing sources to ensure that the new NAAQS are met. The District must follow the appropriate process to resolve any known or foreseeable NAAQS problem.

d. A Violation of NAAQS Is Based on Three Year Average Not One-Time Exceedances

The modeling and monitoring proposed by the District are not consistent with how NAAQS violations are identified. An exceedance of the SO_2 standard is based on the 99th percentile maximum average over three years for the 1 hour standard. This is determined after the air monitoring data is certified. An exceedance of the $PM_{2.5}$ annual standard is based on a three year average. A violation of the 24 hour standard is based on the 98th percentile averaged over three years. It is unreasonable to model a refinery's hourly emissions at all sources at maximum potential emissions for 24 hours. It is beyond unreasonable to model a refinery's maximum hourly emissions at all sources for an annual standard.

3. Designed for Noncompliance

Regulation 12-16 creates a regulatory structure that drives refiners toward noncompliance and/or having to restrict operations well below legally permitted capacities. As outlined below, there are multiple steps toward potential noncompliance.

a. Toxic Air Contaminants

1. *Emissions Inventory*. The Interim Staff Report states that the methodologies used to prepare the On-Going Annual Emissions Inventory and Crude Slate Report are likely to change periodically to reflect any improvements in emissions inventory

methodologies used. It follows that these annual inventories will not provide apples-to-apples comparisons year over year. Therefore, a refinery's emissions inventory, called for in Regulation 12-15, based on erroneously high emission factors for 2015 data, and using overly conservative risk levels set in the Office of Environmental Health Hazard Assessment's (OEHHA)'s revised Air Toxic Hot Spots Risk Assessment Guidelines, could produce results that indicate that emissions have increased, when in fact, they have not; only the methodologies preferred by the District have changed. Using the overly conservative OEHHA models, a facility would appear to have a Refinery-Wide Health Risk exceeds the Significant Risk Threshold set forth in Subsection 12-16-301.2.

2. *Accidental Air Release.* Section 12-16-201 defines an accidental air release as an unanticipated emission of a criteria pollutant, toxic air contaminant, and/or greenhouse gas into the atmosphere required to be reported in a Risk Management Plan (RMP) under 40 CFR §68.168. §68.168 requires the submittal of the five-year accident history in the RMP for all accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage. 40 CFR §68.3 defines accidental release as an unanticipated emission of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source, and a regulated substance is any substance listed pursuant to section 112(r)(3) of the Clean Air Act as amended, in §68.130. §68.130 does not include greenhouse gases as a regulated substances, therefore greenhouse gases related from accidental releases are not required to be reported in the Emission Inventory as defined in Section 12-16-206. By including greenhouse gases and tying it to the RMP requirements, the District is expanding applicable requirements under other rules to introduce additional opportunities for noncompliance that were not considered during rulemaking.

3. *Reduction Timeline.* The proposed rule affords too much discretion to the APCO to determine whether the reduction timelines should be enlarged or shortened. Section 12-16-403 states that the refinery must reduce emissions or health risk from the refinery to "a level below the Significant Risk Threshold as soon as feasible, but by no later than five years from the date of submission" [of the Risk Reduction Audit and Plan (RRAP)]. Subsection 403.1 states that the District may extend the compliance deadline up to five additional years if the owner/operator demonstrates to the APCO that implementation of the RRAP "places an unreasonable economic burden on the facility operator or is not technically feasible." Subsection 403.2 would allow the APCO to shorten the initial five-year implementation period if the APCO determines that it is technically feasible or economically practicable to more quickly implement the Risk Reduction Measures identified in the RRAP, or if the Unreasonable Risk threshold in 12-16-301.3 is exceeded (which would not be unlikely if the District later revised the threshold

even lower than already proposed). In the first instance, the APCO determines whether the facility operator's demonstration is adequate; in the second, the APCO makes the determination without input from the facility operator. In both cases, the decision-making criteria are not listed or defined, nor are the risk reduction levels defined. The absence of objective criteria creates the potential for poorly-informed or subjective judgments and inconsistency in application.

4. *RRAP Updating.* Section 12-16-409 states that if information becomes available regarding health risks or emission reduction technologies "that may be used by a refinery that would significantly impact health risks to exposed persons, the APCO may require a refinery owner/operator to update the RRAP to reflect the information and resubmit the RRAP to the APCO for approval." Criteria for this determination should be specified and an appeal process should be included in order to safeguard against unnecessary or ill-conceived revisions based on subjective or arbitrary judgments, poor-quality data, unsupported claims by vendors with a fiscal interest in pushing new technology or products, and the like.

b. NAAQS ($PM_{2.5}$ and SO_2)

1. *Compliance Demonstration.* According to Section 12-16-406, a refiner may demonstrate compliance through modeling or monitoring, OR it may simply bypass that step and submit an Emissions Reduction Plan.

   i. *Modeling.* A refiner attempts to demonstrate compliance with the SO_2 or $PM_{2.5}$ NAAQS using its PTE values in the modeling protocol, as required by Regulation 12-16-405, but due to the overly conservative nature of the model (as the District acknowledges) and of the theoretical PTE emission values, the refinery exceeds a NAAQS concentration limit at a downwind location that has been determined by the District as the receptor point for the Maximally Exposed Individual (a new definition ostensibly created for toxics exposure but likely to be used for the criteria pollutants of concern). The facility should be able to use real emissions data, instead of PTE values, which are really only used for initial permitting because of the lack of real emissions data.

   ii. *Monitoring.* Subsection 406.2.1 requires that the owner/operator submit a proposed air monitoring study protocol that must account for the expected points of maximum concentration indicated by dispersion modeling results, as well as background concentrations. When ambient air monitoring studies are designed, modeling is used mainly to determine wind direction and spacing of monitors. The language in the proposed regulation creates an ambiguity by implying that perhaps the refinery would have to explain results that are lower than those that would be predicted by modeling. Subsection 406.2.5 states that whenever the monitoring indicates an actual exceedance of the NAAQS, the APCO will determine the refinery's contribution to the

exceedance. This is an unfair targeting of the refining industry, when the Bay Area air basin is clearly populated by other stationary sources, as well as mobile sources, which are the main contributors to ambient air concentrations of these criteria pollutants.

iii. *Finding of Compliance.* Section 12-16-406.3 states that if a refinery with an approved air monitoring study protocol cannot reasonably be expected to demonstrate compliance, the APCO may publish such finding on the District's website. This ability to preemptively determine future noncompliance is completely without merit. Further, the presumption that a facility is deemed not to have demonstrated compliance unless and until the APCO publishes a finding of compliance suggests that a refinery could be unlawfully targeted for enforcement simply because the APCO has failed to act on the refinery's compliance demonstration.

2. *Emissions Reduction Plan.* Whether a refinery has failed (or is expected by the APCO to fail) to demonstrate compliance through modeling or monitoring, it must submit an Emissions Reduction Plan (ERP). According to 12-16-407.1, the ERP must identify Air Emission Reduction Measures that would result in NAAQS compliance within two years of ERP submittal. Such measures are defined in Section 12-16-203 to include equipment upgrades or modernization, improved emissions capture or control, process changes, operational changes, or feedstock modifications. There is no discretion for the owner/operator to determine which measures would be most effective in achieving the reductions. The proposed rule lacks clear standards or criteria for approval of the emissions reductions plan; rather, it appears that the APCO may disapprove elements of the plan based on subjective and potentially arbitrary disagreement. The proposed rule should be restructured so that the regulated entity identifies measures necessary to reduce any alleged risk and the District evaluates the ERP based on clear, objective criteria.

3. *Emission Reduction Audit.* If the Air Emissions Reduction Measures are not projected to achieve NAAQS compliance within two years of the ERP submittal, the facility must include an Emissions Reduction Audit in the ERP, according to Section 12-16-407.2. Since most capital projects would trigger this audit requirement due to the length of CEQA review and the District's permitting process, the time frame should be expanded to at least five years. Furthermore, the vague requirement to identify "all technically feasible" air emission reduction measures could be construed to include theoretical measures that have not been tested or demonstrated to be effective.

4. Refinery-wide SO_2 and $PM_{2.5}$ Emission Limits. 12-16-304 requires a refinery not exceed the refinery-wide PTE limits for SO_2 and $PM_{2.5}$. Reductions from a Bay Area cap would likely be compensated through emissions leakage elsewhere in the State, and *this impact must be evaluate*d as part of the District's CEQA review. Under 14 CCR §15003, the lead agency must consider the whole of an action, not

simply its constituent parts, when determining whether it will have a significant environmental effect (paragraph h). Since the application of source specific and refinery-wide SO_2 and $PM_{2.5}$ emission limits restrict emissions beyond what has been legally permitted through existing BAAQMD and federal rules, emissions leakage can reasonably be expected as production shifts to other parts of California or out of State. When considering the whole of the impacts associated with Regulation 12-16, the District is compelled to conduct a CEQA review that incorporates statewide impacts, not just those within the District's air basin. As Valero can attest to, this standard has been applied when evaluating other projects and the BAAQMD should be expected to comply with the same standards others must meet. By not considering the full potential impacts of the project, the BAAQMD is establishing limits may not have any real impact on reducing emissions.

Please contact me at (707) 745-7545 if you have any questions.

Sincerely,

Donald W. Cuffel
Manager – Environmental Engineering

DWC/KSB/tac

Enclosure

Amy Million

From: Arlene <acvancraeynest@gmail.com>
Sent: Saturday, March 26, 2016 8:06 PM
To: Amy Million
Subject: Valero oil-train

RECEIVED
MAR 29 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

Ms. Million,

Just want to express my opposition to the Valero oil-train's destination to the Benicia refinery.
It's time that we all take a stand for the safety and health of our citizens, who will be most affected along the route that the trains would take.

Sincerely,
Arlene C. Van Craeynest

Sent from my iPad

Amy Million

From: Elizabeth Lasensky <elasensky@yahoo.com>
Sent: Monday, March 28, 2016 11:20 AM
To: Amy Million
Subject: Public Comment on Valero Crude by Rail Project for Benicia City Council

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MAR 29 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

March 28, 2016

Amy Million, Principal Planner
Community Development Department
250 East L Street, Benicia, CA 94510
amillion@ci.benicia.ca.us
Fax: (707) 747-1637

Dear Ms. Million:

The following letter was submitted to you on July 9, 2014 as part of the record for the Benicia Planning Commission hearings on the Valero Crude by Rail Project.

I am resubmitting this letter for the record to the City Council of Benicia for consideration on the Valero Crude by Rail Project. The FEIR for this project failed to adequately address the concerns outlined in my original letter. In addition, the FEIR failed to address other concerns of uprail communities. For these and many other reasons, the FEIR was rejected and the use permit was denied by your Planning Commission.

I hope that Benicia City Council will carefully review the many pages of testimony and documentation already submitted on this project. There were many excellent, instructive and invaluable arguments made against the project. These arguments should be considered before ruling on the appeal and before allowing an indefinite delay by the applicant.

Sincerely,

Elizabeth Lasensky

187 Full Circle
Davis, CA 95618

July 9, 2014

Brad Kilger, City Manager
250 East L Street, Benicia, CA 94510
bkilger@ci.benicia.ca.us
Fax: (707) 747-1637

Amy Million, Principal Planner
Community Development Department
250 East L Street, Benicia, CA 94510
amillion@ci.benicia.ca.us
Fax: (707) 747-1637

Dear Mr. Kilger and Ms. Million,

Please add my comments to the public legal record on Valero's Crude By Rail Project and incorporate them as part of the review of its DEIR. *In addition,* please forward my comments to the Planning Commissioners.

I am a resident of Davis. I live in a senior mobile home park within a mile from the tracks for the proposed Valero rail project. Our park is approximately a mile from a 10mph left-handed cross-over between the main tracks that lie east of the Davis train station. I am also a member of the Yolo Basin Foundation, which provides funds and volunteers for the Yolo Basin Wildlife Refuge. The Yolo Basin is the beginning of the Delta, from which much of California gets its water. In addition, I am a frequent passenger on the Capitol Corridor, a commuter train jointly operated by Amtrak, Union Pacific and Caltrans.

The two 50-car trains will come across the Yolo Bypass, which includes our sensitive Yolo Basin Wildlife Preserve, will share tracks with Amtrak passenger trains and will parallel Interstate 80. They will pass within a mile of several senior housing complexes and our police station, pass through our downtown and several additional residential areas, and exit town along the edge of UC Davis, including the Mondavi Center complex. Needless to say, I am very concerned about the impact of crude oil trains rumbling through my community every day.

Right now we up-rail towns and cities have insisted on our right to comment on the EIR for the Valero Benicia Crude-by-Rail Project and in a few months on the Phillips 66 Santa Maria Rail Spur Project. According to the California Energy Commission, we can expect CA to import as much as 25% of its crude oil by rail within the

next few years, translating into five or six trains per day passing through our town. Given the cumulative impact of such increased crude-by-rail traffic, up-rail communities have much at risk and deserve a voice in the process

The Draft EIR that you are considering does not include issues specific to uprail communities. Here are some of my concerns.

1. Air, noise and vibration pollution along the train route

As noted above, I live in a senior mobile home park, about a mile from the tracks. Across the street is a nursing home and in the other direction are two additional senior housing complexes. A high percentage of the residents have respiratory and ambulatory issues. Many residents will be connected to sensitive machines for which vibration might be a problem. Increased noise will be a factor for any residents living so close to the tracks.

What mitigation measures will be taken to offset the air pollution caused by increased particulate matter raised from the trains?

What measures will be taken to offset the air pollution caused by fumes escaping from the train cars?

What measures will be taken to offset vibration from the trains?

What measures will be taken to offset the increased noise from additional trains, cars and weight rolling through town at all hours?

2. Public safety

a. Currently the railroads are using 78,000 unsafe DOT 111A tank cars that are prone to rupture when they derail. Even cars that meet the 1232 standards from 2011 are prone to rupture. Although the industry says it could phase out the older cars over 10 years, that is not reassuring when you live within a mile of a crossover section.

b. There is a 10mph left-handed cross-over between the main tracks several hundred feet east of the Amtrak station.

Several derailments elsewhere in North America have been caused by human error when a train proceeds through a low speed crossover between two higher speed tracks and failing to reduce speed;

one near Chicago and one in Canada caused fatalities.

The Davis cross over should be replaced with a cross over with a higher speed rating similar to others on the Capitol Corridor line.

Trains should slow down in populated areas

c. The Davis Enterprise reported that two train derailments have happened in Davis since 2003 and summaries of the articles are below.

Davis Enterprise, The (CA)-January 29, 2003
Author: Lauren Keene/Enterprise staff writer

People traveling by Amtrak trains experienced some service delays in Davis this morning, the result of a freight train accident that derailed four cars Tuesday night.

No injuries resulted from the derailment, which occurred at about 7:45 p.m. on the Union Pacific Railroad tracks that run parallel to Second Street, near Cousteau Place.

Bob Jones, a general manager with California Northern Railroad, said the derailment was the result of an "overspeed impact" that occurred when a 48-car train coming from Woodland attempted to connect with another line consisting of 27 cars. The empty cars were then destined for Roseville.

"For some reason they didn't slow as anticipated," Jones said, adding that the longer train was traveling an estimated 5 to 6 mph. "They needed to be under four (mph)."

http://docs.newsbank.com/s/InfoWeb/aggdocs/NewsBank/105D11605DB00D87/105FF707937F67E5?p_multi=DVEB&s_lang=en-US

Davis Enterprise, The (CA)-November 4, 2009
Author: Jonathan Edwards

Enterprise staff writer

A freight train derailed Tuesday afternoon in downtown Davis and threatened to snap power lines, crush fences and roll into back yards.

The tracks collapsed under a 12-car train and two cars toppled, said Capt. Richard Moore with the Davis Fire Department. A third car's wheels came off the rails, but the car itself stayed upright.

No one was injured in the accident, which was reported to fire crews at 4:18 p.m.

Each of the two downed cars carried 90 tons of lime, a chemical used in construction, Moore said. A hazardous materials crew was not called in.

http://docs.newsbank.com/s/InfoWeb/aggdocs/NewsBank/12BC77A26EEE1578/105FF707937F67E5?p_multi=DVEB&s_lang=en-US

YouTube footage of the train derailment on November 6, 2009 can be seen at:
http://www.youtube.com/watch?v=1FKkOoitQgw

http://www.youtube.com/watch?v=gQSLplkzPWs

c. Bridge and track inspections should happen regularly and be reported to the public.

d. What evacuation plans have been prepared for Davis when a spill and/or explosion occurs? What evacuation plans have been prepared for transporting injured, ill and infirm residents from senior housing complexes and nursing homes?

e. What plans have been prepared for dealing with catastrophic loss of life and property after a spill and/or explosion occurs?

f. What plans have been prepared to transport injured residents and responders to hospitals after a spill/explosion has occurred?

g. What plans have been prepared for rerouting Interstate 80 in Davis when a spill and/or explosion occurs?

h. What plans have been prepared for alternate headquarters and emergency response for the Davis Police Department should a spill and/or explosion occur? Will our emergency responders have access to information on what exactly is being transported in the train cars?

i. What plans have been prepared for protecting passengers on Amtrak from the risks of spills and/or explosions? What contingency plans are in place to reroute Amtrak trains after a spill and or/explosion?

3. Environmental damage

The water in the Yolo Bypass is the beginning of the Delta. Any spills in this area will have enormous implications for the entire state, including drinking water, rice growing, bird migration and drought relief.
a. Rail tracks and bridges need to be inspected regularly, particularly after extreme weather events, to be sure they are supporting the axel load of the long, heavy, and frequent oil trains. This is especially true regarding the additional weight loads as the heavier updated tank cars with shielded hulls are put into service.
b. What plans have been prepared for remediation after potential spills/explosions in Yolo Basin? How will the spill/explosion be contained?

c. What plans have been prepared to protect endangered species from pollution caused by oil trains?

4. Liability

Should there be a spill/explosion on the scope of the Lac Megantic (Canada) explosion in Davis, who carries the liability? That Canadian town has yet to be compensated. What can we expect in Davis? Should there be a spill in Yolo Basin, what compensation is possible when a state's water supply is at risk?

Lastly and most importantly, moving this highly volatile, flammable and toxic crude across thousands of miles of rivers, forests, bridges and communities is sheer madness. Each trainload is a disaster waiting to happen. Each ton of crude is a ton for climate change.

Should this project be approved, the City of Benicia and its residents carry at least a moral liability for any disasters that happen along the thousands of miles of track to Benicia. The 25% of your General Fund that comes from Valero taxes to your city comes at a price to the planet.

The fossil fuel industry is literally and figuratively a dying industry. The City of Benicia can reject this project and redirect its focus to renewable energy. That is the future.

Thank you,

Elizabeth Lasensky
187 Full Circle
Davis, CA 95618

Amy Million

From: R Solomon <risolom@gmail.com>
Sent: Tuesday, March 29, 2016 5:02 AM
To: Amy Million
Subject: Baked crude oil rail transport

RECEIVED
MAR 29 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

To: Benicia City Council and Planning Commission

As residents of Oakland we are writing you today to express our opposition to plans which allow Bakken crude oil to be transported into Benicia by train.

It is clear that current safety standards will not protect the public because Bakken crude is particularly volatile. The train tanker cars being used to transport it are single hulled and old. The DOT has plans for the railroad to upgrade these cars but the time frame over which it will allow this is many years. The DOT itself has predicted that derailments and accidents will occur with these trains. The California Attorney General and the NTSB have sent out alarms about this dangerous transport of this explosive crude oil. Accidents in Ontario, North Dakota, and other areas of the USA have demonstrated just how destructive and deadly these accidents can be.

You realize, of course, that the city councils of neighboring communities where these trains will pass before arriving in Benecia like Davis and Sacramento have passed resolutions opposed to these trains. Other communities further down the line like Richmond, Berkeley, and Oakland have done likewise.

How can you approve a plan which so many of your neighbors have opposed? How can you approve a plan which will expose thousands of people who live, work, and attend school near these tracks in Benicia to this kind of danger?

Please do NOT approve these plans.

Chihoko and Richard Solomon

Amy Million

From: Diane Bolman <dbmarin@sonic.net>
Sent: Monday, March 28, 2016 3:57 PM
To: Amy Million
Subject: oil trains

RECEIVED
MAR 29 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

Please count me among the many citizens of Benicia and communities nearby who oppose bringing dangerous Bakken crude oil into Benicia by trains. We have seen horrendous resulting explosions following the recent massive increase in transport of crude oil from Bakken shale fields in North Dakota and tar sands mines in Alberta. The California Attorney General and the National Transportation Safety Board have sent out alarms about this dangerous new method of transporting unconventional crudes.

Not in Benicia! Not in the Bay Area! Not in communities uprail and downwind of Benicia!

Please convey my opposition to the City of Benicia and Valero.

Diane Bolman
Novato

Amy Million

From: marjorie61@aol.com <marjorie618@aol.com>
Sent: Wednesday, March 30, 2016 2:23 PM
To: Amy Million
Subject: Valero Oil-train Project

RECEIVED
MAR 30 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

Dear Benicia City Council:

Your Planning Commission has spoken, the community has spoken, the environmental community has spoken. It is time for the council to defeat the Valero oil-train project. Two 50-tanker oil trains each day into the Benicia refinery is not safe. The possibilities of derailments, oil spills and explosions are too great a risk to the community. I hope you will vote against this dangerous and environmentally unsound project.

Marjorie Xavier
3252 Guillermo Place
Hayward, CA 94542
marjorie618@aol.com

211 E. D. St, Apt 121
Dixon, CA 95620
707-693-5113
March 30, 2016

Ms. Amy Million, Principal Planner
Benicia Community Development Department
250 East L Street
Benicia, CA 94510
amillion@ci.benicia.ca.us

RECEIVED
MAR 30 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

Dear Benicia City Council Members:

I am writing to express my opinion that the Valero Oil Project should be rejected. I live in Dixon, perhaps 50 yards from the tracks that carry the oil trains. There are 100 senior citizens living in my apartment complex. There is a trade school across the street, and an elementary school a block away. The tracks go right through downtown Dixon, where there are stores, businesses, a fairground, a power station, and churches. The photos I have submitted show the proximity of these sites to the tracks. We are all in the blast zone for any accident in the Dixon city area.

In local photographs that have previously been submitted, uprail citizens have tried to show how vulnerable towns like Davis and Dixon are to the oil trains coming through. Our communities are focused on the possibility of spill or explosion, and the underlying fear that those of us near the tracks will carry all day, every day. I understand from the scientific presentations at the San Luis Obispo hearings that even the returning cars with residual gas and fumes are hazardous and potentially explosive. Our fears are very well founded.

Many people choose to live in communities like Dixon and Davis to avoid Bay Area or Sacramento air pollution and have a healthier environment for their families. All our local government agencies – the city of Davis, Yolo County, the seven local Air Quality Management Districts, and the Sacramento Area Council of Governments (22 cities in 6 counties) – believe there are reasonable air pollution mitigations possible that are not preempted. This is heartening.

I am inclined to believe their position rather than that of those writing the EIR. In this EIR, every suggestion for mitigation of health, safety, and environmental pollution risk in the municipal and agency letters is acknowledged and then dismissed because of the presumption of preemption. None of the mitigation suggestions is even examined by the EIR. The Sacramento Municipal Air Quality Management District specifically offered staff to work with Valero to develop a mitigation plan to address the air quality issues. The offer was not accepted.

The concerns and risks noted by citizens, including pollution, spills in wetlands and bodies of water, spills or damage in sensitive environments, explosion, and impossibility of adequate emergency response are acknowledged as "serious and unavoidable" and dismissed. One might well ask why so much research was done and so many years of study made by the Benicia Planning Commission, and why citizen concerns and comments were sought and accepted if these were not finally to be taken seriously?

The people like me who live in the blast area feel very vulnerable. Suppose that, God forbid, there is an accident uprail in which hundreds, or even thousands of people just like me are killed. *You know now* there are risks that cry for mitigation–in the EIR you list and acknowledge them all! And because you openly state that you know now, I trust you realize that every single one of those people's families will sue the City of Benicia, Valero, the railroad, and anyone else they can find to blame. Perhaps the hundreds or thousands of suits would eventually be dismissed, but the city could be placed in serious financial jeopardy, if not bankrupted, by having to respond even minimally to the barrage of suits.

Reading your staff report, it seems as if the city feels it need not address the concerns of uprail communities because of the federal preemption of the railroads. I find this odd, as Valero is an oil company - not a railroad. You assert that the uprail communities are not your sphere of concern. Instead, you wish to focus on the tax revenue and the small number of jobs this project will bring to Benicia. But I urge you to think not just about Benicia, but about the uprail communities that will be absorbing the risks of the trains going through populated areas, as well as the health impacts of the air pollution being generated. We all share the quality of life in our state. Even if you decide you have no legal responsibility toward us, your uprail neighbors, do you not have a moral one?

Thank you for listening with your hearts as well as your desire for the economic well-being of Benicia. There are many paths to economic security, and I believe it is always wisest to remain congruent with our higher values.

Most sincerely,

Carol Warren

I-80
RAILROAD
CROSSING
DO N
STO
ON
TRAC

RECEIVED
MAR 30 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

BOARD OF SUPERVISORS
COUNTY OF SACRAMENTO
700 H STREET, SUITE 2450 • SACRAMENTO, CA 95814

PHIL SERNA
SUPERVISOR, FIRST DISTRICT
Telephone (916) 874-5485
FAX (916) 874-7593
E-Mail: sernap@saccounty.net

March 28, 2016

Benicia City Council
250 East L Street
Benicia, CA 94510

RE: Valero Crude by Rail Project

Honorable Councilmembers:

I write to respectfully express my opposition to Valero Energy Corporation's proposal to build an oil train terminal at their Benicia refinery. The Environmental Impact Report (EIR) for the Valero Crude by Rail Project in Benicia concludes that the project would cause a significant and unavoidable rail accident hazard risk. As such, it is your decision that can unequivocally prevent this significant public safety risk.

The EIR identifies that trains accessing the project would traverse Sacramento, including the heavily populated downtown area that I represent. It would cross numerous creeks and rivers, and run immediately adjacent to and through vulnerable residential neighborhoods. A rail accident resulting in oil spills, fire or a toxic explosion could have disastrous life safety, health, environmental and economic consequences. For these reasons, I believe an increase in oil train traffic from this project poses an unacceptable risk to Sacramento County residents and the environment.

In order to protect public safety and the environment, I urge your Council to uphold the Benicia Planning Commission's vote to deny the project. Please contact me or my staff at 916.874.5485 or SupervisorSerna@saccounty.net should you have questions or require further information.

Respectfully,

Phil Serna
Supervisor, District 1

Amy Million

From: Sara Greenwald <anderson.greenwald@att.net>
Sent: Wednesday, March 30, 2016 9:54 PM
To: Amy Million
Subject: Comment for the public record: Valero Crude by Rail

Principal Planner Amy Million
Benicia, CA

RECEIVED
MAR 31 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

Comment for the public record: Valero Crude by Rail

On February 11, the Benicia Planning Commission unanimously rejected approval of the land use permit that would have allowed Valero to construct a rail terminal on Valero property for daily off-loading of two 50-car trains carrying domestic shale oil and/or Canadian tar sands.

Valero's appeal is not unexpected, since the company stands to profit by this expansion. The health costs of bringing the shale oil and low-grade crude through Benicia in these volumes are external to their accounting. No insurance could make up for poisoning of the soil and water where people live and raise their families, not to mention loss of life in a major accident, but to Valero, risks of leaks or derailment or explosion are insurable and therefore simply a business cost.

The final decision lies with the Benicia City Council. At their first hearing on this proposal on March 15, Valero asked the City Council to delay consideration of their appeal of the Planning Commission's decision while Valero prepared to claim protection from federal preemption law governing rail operations. They admitted the delay could take at least three months.
Valero is using the Benicia City Council to prepare a test case to drastically expand the range of federal preemption of rail regulation. They assume they can win because they are a huge corporation that can afford enormous legal costs. They assume that as a major local employer they can intimidate the Benicia City Council.

The preemption law was intended to protect railroads from exploitation by the towns, cities, counties, and states through which they passed, because in theory any small town along the way could hold an entire railroad line hostage, demanding exhorbitant taxes or other concessions to let the trains go through. The Benicia situation is entirely different. The rail spurs from which the crude would be offloaded are not Benicia's, but Valero's private property.

The California Environmental Quality Act (CEQA) does hold in California, however Valero may wish otherwise. Benicia has a right to full disclosure of the impacts of the proposed permitting, and to impose enforceable mitigations and feasible project alternatives. Benicia has the authority to protect its health and safety and uphold the Benicia General Plan.

The Benicia Planning Commission's consensus judgment resulted in a unanimous vote to deny certification of the Final EIR and deny the project permit. I urge the City Council to stand by this wise decision.

Respectfully,
Sara Greenwald

Valero Crude by Rail Project
Public Comments received - Appeal

Identical Comments

"Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009"

Commenter	Date Received	Commenter	Date Received
Individuals		**Individuals**	
Brooke Prather	25-Mar-16	Wendy Diamond	25-Mar-16
Susan Newman	25-Mar-16	Arlene Merryman	25-Mar-16
Kimberly Beliveau	25-Mar-16	Donna Pedroza	25-Mar-16
Janice chung	25-Mar-16	Sondra McKee	25-Mar-16
Kelli Lent	25-Mar-16	Suart Demmy	25-Mar-16
Ct Bross	25-Mar-16	Urmila Padmanabhan	25-Mar-16
Jude Fletcher	25-Mar-16	Janet Gawthrop	25-Mar-16
Kathryn Carroll	25-Mar-16	Kim Stevens	25-Mar-16
Babette Barbie Beaudette	25-Mar-16	Bill R	25-Mar-16
Bonnie McGraw	25-Mar-16	Darlene Meltzer	25-Mar-16
Horace Gray	25-Mar-16	Helga Tarver	25-Mar-16
Bill Todd	25-Mar-16	Sharon Rodrigues	25-Mar-16
Judith Berzon	25-Mar-16	Al Weinrub	25-Mar-16
Jennifer Larsh	25-Mar-16	Timothy Green	25-Mar-16
Mary Moresi	25-Mar-16	Dana Hinkle	25-Mar-16
Brett Deschepper	25-Mar-16	Debra Reuter	25-Mar-16
Regina Simpson	25-Mar-16	Linda Waddell	25-Mar-16
Linda I Johnson	25-Mar-16	David Gates	25-Mar-16
Tommi Watson	25-Mar-16	Rhonda Cera	25-Mar-16
Kristen Lowry	25-Mar-16	Dennis Monaghan	25-Mar-16
Roberta Bobba	25-Mar-16	Mark Clark	25-Mar-16
Robert Luke	25-Mar-16	Michelle Viscuso	25-Mar-16
Jonathan Eden	25-Mar-16	Bette Burrows	25-Mar-16
Aida Brenneis	25-Mar-16	Travis Richardson	25-Mar-16
Clifford Anderson	25-Mar-16	Elaine Everett	25-Mar-16
Lorraine Lowry	25-Mar-16	Fredrick Seil	25-Mar-16
Paula Hargraves	25-Mar-16	Misty Mcintyre	25-Mar-16
Cailin Trimble	25-Mar-16	Joel Eisenberg	25-Mar-16
Lary Heath	25-Mar-16	Ann Catherine Keirns	25-Mar-16
Sharon Prell	25-Mar-16	Laura Galligan	25-Mar-16
Carrie Ousley	25-Mar-16	Mindy Phypers	25-Mar-16
Vince Brim	25-Mar-16	Judith Poxon	25-Mar-16
Frank Kiernan	25-Mar-16	Suzanne mcmillan	25-Mar-16
Ted Hoffman	25-Mar-16	Ed Green	25-Mar-16
R. Marilyn Wilson	25-Mar-16	Bonnie Pannell	25-Mar-16
cynthia Sills	25-Mar-16	Kathleen Young	25-Mar-16
Lindsay Benjamin Britton	25-Mar-16	Eugenia Larson	25-Mar-16
Michael Garitty	25-Mar-16	Christian Nelson	25-Mar-16
Lara DaSilva	25-Mar-16	Marlyne Hadley	25-Mar-16
Sam Parsons	25-Mar-16	Joann Mizutani	25-Mar-16
Donald Taylor	25-Mar-16	Kathleen Styc	25-Mar-16
Barbara Hailey	25-Mar-16	Bill Gardner	25-Mar-16
William Webster	25-Mar-16	Julie Mosquedo	25-Mar-16
Marguerite Sgrillo	25-Mar-16	Dean Griswold	25-Mar-16
Christian Heinold	25-Mar-16	Thomas Lux	25-Mar-16
Marjory Keenan	25-Mar-16	Ruby MacDonald	25-Mar-16
Michael D-Adamo	25-Mar-16	Heather Mchugh	25-Mar-16

Robert Krueger	25-Mar-16	Charlotte Williams	25-Mar-16
Elizabeth levy	25-Mar-16	Rhonda Ory	25-Mar-16
Kathryn La Rue	25-Mar-16	Tom Slone	25-Mar-16
Kathleen weaver	25-Mar-16	Maya Knowles	25-Mar-16
Irene Kane	25-Mar-16	Christopher King	25-Mar-16
Priscilla Whitney	25-Mar-16	Claire Watson	25-Mar-16
Lynnette Delgado	25-Mar-16	Lynn Orion	25-Mar-16
Roxana Labrador	25-Mar-16	Steven Taylor	25-Mar-16
Mary Bobadilla	25-Mar-16	Vicki Gold	25-Mar-16
Gregory Ross	25-Mar-16	Harley Sebasitian-Lewis	25-Mar-16
Gail Weininger	25-Mar-16	John Burke	25-Mar-16
David Yager	25-Mar-16	Jennifer Sellers	25-Mar-16
Rollin Odell	25-Mar-16	Carol Chapman	25-Mar-16
Maris Bennett	25-Mar-16	Carol Mock	25-Mar-16
Barbara Burgess	25-Mar-16	Ken Lawson	25-Mar-16
Mary McManus	25-Mar-16	Nancy Flynn	25-Mar-16
Joan Kiley	25-Mar-16	Lauren Schiffman	25-Mar-16
Ron Vieira	25-Mar-16	Lizeth Brock	25-Mar-16
Pete Van Hoorn	25-Mar-16	Anne Hodgkinson	25-Mar-16
Janet Flanagan	25-Mar-16	Anne Reldt	25-Mar-16
Robert Kessler	25-Mar-16	Melissa Miller	25-Mar-16
Natalie Blasco	25-Mar-16	Agnes Puntch	25-Mar-16
Linda Clark	25-Mar-16	Philip Fort	25-Mar-16
Teri Endrich	25-Mar-16	James Sherrel	25-Mar-16
Lauren Hanzel	25-Mar-16	Nancy Hartman	25-Mar-16
Rebecca Gottowski	25-Mar-16	Beatrice Nelson	25-Mar-16
Pat Morgan	25-Mar-16	Randy Vogel	25-Mar-16
Inti Chan	25-Mar-16	Yvonne Cabrales	25-Mar-16
Amy Spencer	25-Mar-16	Cindi Lund	25-Mar-16
Jason Ellis	25-Mar-16	Julie Ann Kanoff	25-Mar-16
Kathleen Powell	25-Mar-16	Rory Alden	25-Mar-16
Nancy Auker	25-Mar-16	Michele Roma	25-Mar-16
Anthony Stratton	25-Mar-16	Alexey Korzuchin	25-Mar-16
Judith Wright	25-Mar-16	Roberta Bailey	25-Mar-16
Nancy Esajian	25-Mar-16	Chris Middleton	25-Mar-16
Miles Jordan	25-Mar-16	Allen Carter	25-Mar-16
Noelle Filice-Smith	25-Mar-16	Pat Turney	25-Mar-16
Aaron Reaven	25-Mar-16	Lesley Hudak	25-Mar-16
Rick Robins	25-Mar-16	John Everett	25-Mar-16
Raven Davis-King	25-Mar-16	Lawrence Padilla	25-Mar-16
Lee Reis	25-Mar-16	Dianne Winne	25-Mar-16
Trevor Niemeyer	25-Mar-16	Ross Woodbury	25-Mar-16
Victoria Kuhns	25-Mar-16	April Parkins	25-Mar-16
Joan Lichterman	25-Mar-16	Mitch Cohen	25-Mar-16
Jack Arnold	25-Mar-16	Kristin Mikkelson Jonsson	25-Mar-16
Blake Wu	25-Mar-16	Michele Kitts	25-Mar-16
Lowell Richardson	25-Mar-16	Felipe Garcia	25-Mar-16
Robert Jasper	25-Mar-16	Barbara Rose	25-Mar-16
Stephen Tchudi	25-Mar-16	Nancy Berman	25-Mar-16
Sonja Derose	25-Mar-16	Paul Greenfield	25-Mar-16
Ann Dale	25-Mar-16	Kathryn Hirt	25-Mar-16
Kathleen Bungarz	25-Mar-16	Elizabeth Smith	25-Mar-16
Norman Frank	25-Mar-16	Katherine Leahy	25-Mar-16
Debra Singer	25-Mar-16	Deborah and Joe Santone	25-Mar-16
Jerilynn Debonis	25-Mar-16	Kermit Carraway	25-Mar-16
Thomas Brown	25-Mar-16	Ramsey Gregory	25-Mar-16

Charles Heinrichs	25-Mar-16	Teri Raphael	25-Mar-16
Piers Strailey	25-Mar-16	Dandelo Edwardson	25-Mar-16
Kimberly Wright	25-Mar-16	Michael Keene	25-Mar-16
Michael Sanderson	25-Mar-16	Allison Jones	25-Mar-16
Patricia Davis	25-Mar-16	Almalee Henderson	25-Mar-16
Lesley Schultz	25-Mar-16	Guenther Moskat	25-Mar-16
Pam Hooley	25-Mar-16	Rhoda Slanger	25-Mar-16
Ronald Zampa	25-Mar-16	Christopher Ware	25-Mar-16
Asa Mittman	25-Mar-16	David Mundstock	25-Mar-16
William Weaver	25-Mar-16	Angela Schwartz	25-Mar-16
Glen Deardorff	25-Mar-16	Christine Sawyer	25-Mar-16
Martin Rockstrom	25-Mar-16	Chris Nelson	25-Mar-16
Marion Barry	25-Mar-16	Phil Fritz	25-Mar-16
Clyde Willson	25-Mar-16	Javier Saldena	25-Mar-16
Peggy Ruiz	25-Mar-16	Robert Sansone	25-Mar-16
Claudia Stone	25-Mar-16	Janet Milder	25-Mar-16
Marge Barry	25-Mar-16	Randall Frank	25-Mar-16
Richard Bernal	25-Mar-16	Alecto Caldwell	25-Mar-16
Jeffrey Hemenez	25-Mar-16	Maren Poitras	25-Mar-16
Karen Dunson	25-Mar-16	Chelsea Pavone	25-Mar-16
Ginny Madsen	25-Mar-16	Fred Morrison	25-Mar-16
Karen Reggio	25-Mar-16	John Lawler	25-Mar-16
Sue Dunson-Reggio	25-Mar-16	Adrienne Rodriguez	25-Mar-16
A. Christopher Urbach	25-Mar-16	Diane Dulkevich	25-Mar-16
Nikkole Silva	25-Mar-16	Robert Magarian	25-Mar-16
Barbara Norton	25-Mar-16	Scott Maretti	25-Mar-16
James Rygh	25-Mar-16	John Wiesner	25-Mar-16
Anne Spesick	25-Mar-16	Neil Cardew-Fanning	25-Mar-16
Jerry Sullivan	25-Mar-16	Cathy Holden	25-Mar-16
AniMae Chi	25-Mar-16	Scott Nelson	25-Mar-16
Patricia and Scott Mclean	25-Mar-16	Michael Riser	25-Mar-16
Judy Commons	25-Mar-16	Alecto Caldwell	25-Mar-16
Theresa Moreno	25-Mar-16	Theodora Crawford	25-Mar-16
Heidi Nurse	25-Mar-16	Jeff Michel	25-Mar-16
Jason Divine	25-Mar-16	Elizabeth Fisher	25-Mar-16
Joanne Devine	25-Mar-16	Sue Harrington	25-Mar-16
Kathleen Haberer	25-Mar-16	Carolyn Lee	25-Mar-16
Jeffrey Beckers	25-Mar-16	Sue Barthelow	25-Mar-16
Brian Gray	25-Mar-16	Sue Wolfe	25-Mar-16
Brenda Hill	25-Mar-16	Benjamin Hunter	25-Mar-16
Dawne Adam	25-Mar-16	Michael McCall	25-Mar-16
Georgeann Hemingway-Proia	25-Mar-16	Nancy Byers	25-Mar-16
Heidi Zimmerman	25-Mar-16	Diane Hill	25-Mar-16
Katrina Vogamore	25-Mar-16	Aaron Isherwood	25-Mar-16
Sue Mccullough	25-Mar-16	Marian Samson	25-Mar-16
Gary Morris	25-Mar-16	Amanda Bloom	25-Mar-16
Barbara Smith	25-Mar-16	Angela Sweet-Lich	25-Mar-16
Pati Jio	25-Mar-16	Debbie Cox	25-Mar-16
Marianne Barisonek	25-Mar-16	Ruth Cain	25-Mar-16
Belinda Higuera	25-Mar-16	Katharine Owens	25-Mar-16
Karin Peck	25-Mar-16	Connie Weil	25-Mar-16
Barbara Hopkins	25-Mar-16	Nancy Voss	25-Mar-16
Shellie Kirk	25-Mar-16	Nancy Carey	25-Mar-16
Jack Ottosen	25-Mar-16	Richard Howard	25-Mar-16
Martha Land	25-Mar-16	Delan Mcloren	25-Mar-16
Isabella La Rocca	25-Mar-16	Caroline Krewson	25-Mar-16

Holly Erickson	25-Mar-16	John Pasqua	25-Mar-16
Ferdinand Brislawn	25-Mar-16	Marisa D-Souza	25-Mar-16
Mary Pagliero	25-Mar-16	Stephanie Harvey	25-Mar-16
Joan Mac Beth	25-Mar-16	Robert Pangelina	25-Mar-16
Marle Vane	25-Mar-16	Pam Tanimura	25-Mar-16
Mary Oliphant	25-Mar-16	Dana Gatto	25-Mar-16
Carolyn Nork	25-Mar-16	Victor De Vlaming	25-Mar-16
Rand Groh	25-Mar-16	George Burnash	25-Mar-16
Vann Ferber	25-Mar-16	Renee Lopedota	25-Mar-16
Lena Underwood	25-Mar-16	Robert Gibson	25-Mar-16
John Lango	25-Mar-16	Paula Purviance	25-Mar-16
Rachel Broadwin	25-Mar-16	V Burcherre	25-Mar-16
Carol Henning	25-Mar-16	Kathy Sabatini	25-Mar-16
Barbara Brunell	25-Mar-16	Maxine Lewis	25-Mar-16
Ashley Orias	25-Mar-16	Tom Jones	25-Mar-16
Ayesha Vavrek	25-Mar-16	Willetta Clark	25-Mar-16
Norma Odell	25-Mar-16	Leroy Mcpherson	25-Mar-16
Silva Harr	25-Mar-16	Barbara Stannard	25-Mar-16
Kristen Daniels	25-Mar-16	Kcarolina Christensen	25-Mar-16
Wendy Weikel	25-Mar-16	Nancy Friedman	25-Mar-16
Linda Lux	25-Mar-16	Edie Bruce	25-Mar-16
Shelley Hyatt	25-Mar-16	Bill and Suzanne Saul	25-Mar-16
Meghan Behm	25-Mar-16	Sharma Gaponoff	25-Mar-16
David Baca	25-Mar-16	Margaret Bradford	25-Mar-16
Kathy Grant	25-Mar-16	Alison Hill	25-Mar-16
Joann Ross	25-Mar-16	Mark Bradley	25-Mar-16
Dale Nesbitt	25-Mar-16	Anna Morton	25-Mar-16
Robert Stephenson	25-Mar-16	K Strasser	25-Mar-16
Patrick Russell	25-Mar-16	Constance A Ward	25-Mar-16
Casey Mills	25-Mar-16	Jill Ratner	25-Mar-16
Elizabeth Ferguson	25-Mar-16	Valentin Humer	25-Mar-16
Maraiel Ruth	25-Mar-16	Paul Medved	25-Mar-16
Michele Dawn Sanderson	25-Mar-16	Charles Utt	25-Mar-16
Bernadette Barberini	25-Mar-16	Billy Jones Jones	25-Mar-16
Luanne Clayton	25-Mar-16	Aram Attarian	25-Mar-16
Donna Fortner	25-Mar-16	Roberta Stern	25-Mar-16
Constantina Economou	25-Mar-16	Ann Haley	25-Mar-16
Sarah Holder	25-Mar-16	Richard Miller	25-Mar-16
Christopher Mccampbell	25-Mar-16	Marian So	25-Mar-16
Donna Crane	25-Mar-16	Annette Wood	25-Mar-16
Mary Scibek	25-Mar-16	Steve Gorman	25-Mar-16
Eric Ramstrom	25-Mar-16	Karen Krongold	25-Mar-16
Lucretia Jevne	25-Mar-16	Susan Driver	25-Mar-16
Elizabeth Sowa	25-Mar-16	Phyllis Ford	25-Mar-16
Wendy Caesar-Dare	25-Mar-16	Elizabeth Clapp	25-Mar-16
Kevin Mulvey	25-Mar-16	Gail Nordll	25-Mar-16
Joe and Valerie Coakley	25-Mar-16	Cheri Mezzapelle	25-Mar-16
Joan Walker	25-Mar-16	Michael and Dawn Maghakian	25-Mar-16
Arthur Gregorian	25-Mar-16	Helen Hanna	25-Mar-16
Trishia Maruri	25-Mar-16	Joanna Kung	25-Mar-16
Sharon Damiata	25-Mar-16	Bob Kroth	25-Mar-16
Martha Knobler	25-Mar-16	Amanda Schmidt	25-Mar-16
Laurel Stein	25-Mar-16	Joe Michael	25-Mar-16
Mary Lebrato	25-Mar-16	Teresa Brown	25-Mar-16
Cynthia Mcgrane	25-Mar-16	Chris Worcester	25-Mar-16
Devin Farrell	25-Mar-16	Chelsea Emerson	25-Mar-16

Susan Harman	25-Mar-16	Walter Brown	25-Mar-16
Jan Warren	25-Mar-16	Linda Owczarz	25-Mar-16
Dwight Barry	25-Mar-16	James Ashcraft	25-Mar-16
Isabel Leonard	25-Mar-16	Joseph Rodriguez	25-Mar-16
Lynn Quirolo	25-Mar-16	Judith Clayton	25-Mar-16
Evette Andersen	25-Mar-16	Judith Schumacher-Jennings	25-Mar-16
Mary Ann Taylor	25-Mar-16	Kevin O'Byrne	25-Mar-16
John Cant	25-Mar-16	Peggy Loe	25-Mar-16
Jade English	25-Mar-16	Dominic McNaughton	25-Mar-16
Marsha Lowry	25-Mar-16	Joel Sokolsky	25-Mar-16
Madeline Stacy	25-Mar-16	Louise Mehler	25-Mar-16
Susan Kaar	25-Mar-16	Patricia Reese	25-Mar-16
Tamara Perez	25-Mar-16	Michael Dracul	25-Mar-16
Nancy Erb	25-Mar-16	Emerson Mitchell	25-Mar-16
Morris Walsh	25-Mar-16	Paul Vesper	25-Mar-16
Donald and Meredith Binsacca	25-Mar-16	Eleanor Anderson-Miles	25-Mar-16
Hill Blackett Lii	25-Mar-16	Rose Miksovsky	25-Mar-16
Stefanie Flax	25-Mar-16	Jim and Diana Prola	25-Mar-16
Cheryl Maslin	25-Mar-16	Daniel Dole	25-Mar-16
Pamela Buck	25-Mar-16	Sandra Peterson	25-Mar-16
Mary Porfido	25-Mar-16	Rebel Kreklow	25-Mar-16
Nancy Pigg	25-Mar-16	Kerry Mccarthy	25-Mar-16
Cornelius Dykema	25-Mar-16	Greg Demasi	25-Mar-16
Gay Wiseman	25-Mar-16	Nicole Fountain	25-Mar-16
Grant Rich	25-Mar-16	Maggie Coulter	25-Mar-16
Jesse Olswang	25-Mar-16	Nadya Tichman	25-Mar-16
Wendy Williams	25-Mar-16	Lori White	25-Mar-16
Rob Josephson	25-Mar-16	Constantin Crontiris	25-Mar-16
Scott McKay	25-Mar-16	Keith Bein	25-Mar-16
Rene Wise	25-Mar-16	Edh Stanley	25-Mar-16
Nanette Humer	25-Mar-16	Patrick Graney	25-Mar-16
Gregory Fite	25-Mar-16	John Tenney	25-Mar-16
Elizabeth Char	25-Mar-16	Nancy Polito	25-Mar-16
Steve and Isabelle Robey	25-Mar-16	Debbie Hooley	25-Mar-16
Donna holt	25-Mar-16	Lacey Hicks	25-Mar-16
Carolyn Knoll	25-Mar-16	George Speckman	25-Mar-16
Roger Runnoe	25-Mar-16	Diana Ashurst	25-Mar-16
Lara Deluz	25-Mar-16	Sarah Milne	25-Mar-16
Helen Dickey	25-Mar-16	June Ko-Dial	25-Mar-16
Donna De Palma	25-Mar-16	Inez Hileman	25-Mar-16
Mari Matsumoto	25-Mar-16	Larry Bailey	25-Mar-16
Peggy Luna	25-Mar-16	Benjamin Spencer	25-Mar-16
Barbara Nystrom	25-Mar-16	Patrick Russell	25-Mar-16
Coralie Carraway	25-Mar-16	Karen Lassen	25-Mar-16
Carol Fusco	25-Mar-16	Olympia Foster	25-Mar-16
Jack Phillips	25-Mar-16	Rene Lambert	25-Mar-16
Alexander Heald	25-Mar-16	Nadya Disend	25-Mar-16
Mark Howard	25-Mar-16	Annamarta Dostourian	25-Mar-16
Richard Schwartz	25-Mar-16	Jeff Anderson	25-Mar-16
Nina Utigaard	25-Mar-16	Maria Baca	25-Mar-16
Kathleen Devries	25-Mar-16	Alberta Ramon	25-Mar-16
Robert Zimmerman	25-Mar-16	Irma Starke	25-Mar-16
Eric Edmondson	25-Mar-16	William Davis	25-Mar-16
Mary Jane Walker	25-Mar-16	Neil Wilson	25-Mar-16
Laura Kielman	25-Mar-16	Damian James	25-Mar-16
Katy Redmon	25-Mar-16	Neil Ferguson	25-Mar-16

Dan Ballinger	25-Mar-16	Consuelo Valenzuela	25-Mar-16
John Scott	25-Mar-16	Rae Kirk	25-Mar-16
Tom Wendel	25-Mar-16	Judy Jackson	25-Mar-16
Lucio diMauro	25-Mar-16	Joan Zawaski	25-Mar-16
Lana Touchstone	25-Mar-16	Karen Donaldson	25-Mar-16
Vivian Dowell	25-Mar-16	Mary Donaldson	25-Mar-16
Bonnie Moran	25-Mar-16	Brandy Schumacher	25-Mar-16
Linda Baxter	25-Mar-16	Laura Riley	25-Mar-16
A. Applegate	25-Mar-16	Richard Gerber	25-Mar-16
Katherine Mcneill	25-Mar-16	Joan Gatenby	25-Mar-16
Vernon Sanders	25-Mar-16	Ildiko Lewis	25-Mar-16
Joanna Katz	25-Mar-16	Callie Riley	25-Mar-16
Kathleen Feeley	25-Mar-16	Mike Wertheim	25-Mar-16
Daphne lin	25-Mar-16	Gretchen Sauer	25-Mar-16
Michele Banks	25-Mar-16	Vincent Bausano	25-Mar-16
Carol Agnost	25-Mar-16	Coleman Billingslea	25-Mar-16
Julia Adkins	25-Mar-16	Ronald Bogin	25-Mar-16
Thomas Schwemberger	25-Mar-16	Jeffrey Stone	25-Mar-16
Julia Arnold	25-Mar-16	Terril Mchardy	25-Mar-16
Toby Gottfried	25-Mar-16	Loretta Hayes	25-Mar-16
Vicki Lee	25-Mar-16	Stewart Winchester	25-Mar-16
Janet Lenihan	25-Mar-16	Charles Therrell	25-Mar-16
Stacy Nepacena	25-Mar-16	Elizabeth Pallatto	25-Mar-16
Joseph Melvin	25-Mar-16	Margaret Trawick	25-Mar-16
Denise Lindsly	25-Mar-16	Rita Hays	25-Mar-16
Jolene Rogers	25-Mar-16	Kevin mcnamara	25-Mar-16
Ann Myers	25-Mar-16	Margaret Demott	25-Mar-16
Pierre Del Prato	25-Mar-16	Elizabeth Pendleton	25-Mar-16
Steven Vine	25-Mar-16	Julie Ann Kanoff	25-Mar-16
Scott Bartlett	25-Mar-16	Rory Alden	25-Mar-16
Sally Smith	25-Mar-16	Michele Roma	25-Mar-16
Casey Fisher	25-Mar-16	Wayne Steffes	25-Mar-16
Robert Beach	25-Mar-16	Bob Atwood	25-Mar-16
Shirley Ramstrom	25-Mar-16	David Gjeston	25-Mar-16
Paula Summers	25-Mar-16	Rosie Manina	25-Mar-16
James Barrett	25-Mar-16	Ed Giguere	25-Mar-16
Sharon Rose	25-Mar-16	Judy Shattuck	25-Mar-16
Avondus Jackson	25-Mar-16	Shellie Krirk	25-Mar-16
Josh Bodine	25-Mar-16	Aaron Senegal	25-Mar-16
Rita Decker	25-Mar-16	Elizabeth Dodge	25-Mar-16
Suzy Forwood	25-Mar-16	Dennis Waterhouse	25-Mar-16
Joseph Rodriguez	25-Mar-16	Sherry Dunn	25-Mar-16
Arleen Whitmore	25-Mar-16	Gaile Carr	25-Mar-16
Rafael De Leon	25-Mar-16	Don Green	25-Mar-16
Ulrike Silkey	25-Mar-16	Barbara St. John	25-Mar-16
Samuel Durkin	25-Mar-16	Chrysanthi Lawrence	25-Mar-16
James R Monroe	25-Mar-16	Robert Whitehead	25-Mar-16
Francis Davis	25-Mar-16	Karen Dallow	25-Mar-16
Natacha Lascano	25-Mar-16	John Golding	25-Mar-16
Connie Brandon	25-Mar-16	Tari Nicholson	25-Mar-16
Arthur Trefzger	25-Mar-16	Greg Ratkovsky	25-Mar-16
Mike Silver	25-Mar-16	Ballinger Kemp	25-Mar-16
Debra Willis	25-Mar-16	Pamela Osgood	25-Mar-16
Gwen Doebbert	25-Mar-16	Nancy Kelly	25-Mar-16
Kenneth Dalwin	25-Mar-16	Jacquie Duerr	25-Mar-16
Nancy Havassy	25-Mar-16	Ben McClinton	25-Mar-16

Laura Hertel	25-Mar-16	Earla Kirkwood	25-Mar-16
Linda Martin	25-Mar-16	Hannelore Wiseman	25-Mar-16
K. Lee	25-Mar-16	Jim Hard	25-Mar-16
Jeff Zittrain	25-Mar-16	John De La Torre	25-Mar-16
David Isaac	25-Mar-16	Katherine Arnett	25-Mar-16
Rudy Zeller	25-Mar-16	Lee Pettenger	25-Mar-16
Geoffrey Eargle	25-Mar-16	Cheryl Ku	25-Mar-16
Debra Lewis	25-Mar-16	Marilyn Mcmullen	25-Mar-16
Gudrun Hall	25-Mar-16	Joan Pool	25-Mar-16
Bill Miller	25-Mar-16	Mary Richardson	25-Mar-16
Jane Mrowka	25-Mar-16	Mark Gotvald	25-Mar-16
Helene Whitson	25-Mar-16	Martin Iseri	25-Mar-16
Michele Coakley	25-Mar-16	Michael Butler	25-Mar-16
Ron Hansen	25-Mar-16	Gemma Geluz	25-Mar-16
Laura Naismith	25-Mar-16	Michelle Orengo-Mcfarlane	25-Mar-16
S Kaehn	25-Mar-16	Christine C. Jones	25-Mar-16
Peggy Woodin	25-Mar-16	Eric Mooney	25-Mar-16
Pat Kurzman	25-Mar-16	Dagmar Friedman	25-Mar-16
Cheryl Keith	25-Mar-16	Jerry Horner	25-Mar-16
Karen Peel	25-Mar-16	Damien Johnson	25-Mar-16
Pat Sharp	25-Mar-16	Clara Carpenter	25-Mar-16
Janice Cumming	25-Mar-16	Malcolm Moore	25-Mar-16
John Boyd	25-Mar-16	Peggy Kelsay	25-Mar-16
Gary and Mary Shallenberger	25-Mar-16	Linda Morgan	25-Mar-16
Teresa Fisher	25-Mar-16	Kris Muller	25-Mar-16
Mario Galvan	25-Mar-16	Debra Polansky	25-Mar-16
Debra Walker	25-Mar-16	Andrew Siegal	25-Mar-16
Karen Ratay	25-Mar-16	Richard Freeman	25-Mar-16
Joan Ohenley	25-Mar-16	Donna Watson	25-Mar-16
Darien Huey	25-Mar-16	Ann Myers	25-Mar-16
Sheila Jordan	25-Mar-16	John Fabris	25-Mar-16
Rodney Hill	25-Mar-16	Arnold Gatti	25-Mar-16
Nicole Amador	25-Mar-16	Mary Olswang	25-Mar-16
Margaret Talbot	25-Mar-16	Barbara Sandow	25-Mar-16
Michael Mccool	25-Mar-16	Gerry Royse	25-Mar-16
Craig Scherfenberg	25-Mar-16	Sarah Paul	25-Mar-16
Pam Ramirez	25-Mar-16	Brenda Bailey	25-Mar-16
Greg Cover	25-Mar-16	Yin So	25-Mar-16
Ernesto Ferrera	25-Mar-16	Fritz Pinckney	25-Mar-16
Alex Mccollom	25-Mar-16	Segue Fischlin	25-Mar-16
Joan Moricca	25-Mar-16	Elizabeth Potter	25-Mar-16
Joseph Tande	25-Mar-16	Peggy Sweeny	25-Mar-16
Rolando Arango	25-Mar-16	Ian Bolliger	25-Mar-16
Cynthia Nakashima	25-Mar-16	Whitney Shinkle	25-Mar-16
Pat Blackwell-Marchant	25-Mar-16	Harriet Miller	25-Mar-16
Steven Seiberlich	25-Mar-16	Janet Esteves	25-Mar-16
Willa Oconnor	25-Mar-16	Eileen Kramer	25-Mar-16
David Browne	25-Mar-16	Russell Kilday-Hicks	25-Mar-16
Katherine Myskowski	25-Mar-16	Barry Hottle	25-Mar-16
Malc Moore	25-Mar-16	Egil Rosten	25-Mar-16
Anna Campa	25-Mar-16	Madeline Moran	25-Mar-16
Jeremiah Anderson	25-Mar-16	James Connolly	25-Mar-16
Annie Carpenter	25-Mar-16	Randy and Michelle Davis	25-Mar-16
Kristine Raatz	25-Mar-16	Haleh Niazmand	25-Mar-16
Luann Tribble	25-Mar-16	Eleanor Thomas	25-Mar-16
Tom Mcgonigle	25-Mar-16	Felton Davis	25-Mar-16

Lisa Mar	25-Mar-16	Julia Mccarthy	25-Mar-16
Leigh Stamets	25-Mar-16	Mike and Marga Filip	25-Mar-16
Kenneth Kohler	25-Mar-16	Linda Valenziano	25-Mar-16
Cynthia Hodges	25-Mar-16	Janice Pardoe	25-Mar-16
Deborah Sayre	25-Mar-16	Elizabeth Milliken	25-Mar-16
Maureen Pisani	25-Mar-16	Darlene Norwood	25-Mar-16
Diane Mckernon	25-Mar-16	David Whetstone	25-Mar-16
Darrell Robinson	25-Mar-16	Hamerling Santos	25-Mar-16
Heidi Nurse	25-Mar-16	David Lingren	25-Mar-16
Rebekah Carey	25-Mar-16	Amy Zink	25-Mar-16
Pam Gumpertz	25-Mar-16	Timothy Moder	25-Mar-16
Bill Pezick	25-Mar-16	Lauren Elizabeth	25-Mar-16
Jeanette Meeker	25-Mar-16	Mark Springer	25-Mar-16
Benjamin Lev	25-Mar-16	Katherine Silvey	25-Mar-16
Gail Odom	25-Mar-16	Lynette Ridder	25-Mar-16
Jay Rutherdale	25-Mar-16	Ana Belle	25-Mar-16
Kathleen Keigharn	25-Mar-16	David Okner	25-Mar-16
Barbara Koeth	25-Mar-16	Nikki Nafziger	25-Mar-16
Joan Borame	25-Mar-16	Karen Springer	25-Mar-16
Jason Gardner	25-Mar-16	Gary Kielbasa	25-Mar-16
Jim Roberts	25-Mar-16	Geneva Omann	25-Mar-16
Scott Miller	25-Mar-16	Colleen Harrison	25-Mar-16
Craig Volpe	25-Mar-16	Corbett Bray	25-Mar-16
Clark Quinn	25-Mar-16	Michael Kaufman	25-Mar-16
Dave Rawcliffe	25-Mar-16	Anita Watkins	25-Mar-16
Phil Riser	25-Mar-16	Peter Eggleton	25-Mar-16
Austin Willacy	25-Mar-16	Heather Vollstedt	25-Mar-16
Pamela Lyons	25-Mar-16	Michele Sanderson	25-Mar-16
Raymond Welch	25-Mar-16	Karen Eikeland	25-Mar-16
J Lhesli Benedict	25-Mar-16	Melissa Gutierrez	25-Mar-16
Polly Dallas	25-Mar-16	Raymond Marshall	25-Mar-16
Angelo Digangi	25-Mar-16	Tami Phelps	25-Mar-16
Anothony Jammal	25-Mar-16	Jim Tangney	25-Mar-16
Lauren Ranz	25-Mar-16	Scott Troyer	29-Mar-16
Barbara Cone	25-Mar-16	Kari Akers	29-Mar-16
Ernest Rosenberg	25-Mar-16	J Lane	29-Mar-16
Kersti Evans	25-Mar-16	Vincent Webb	29-Mar-16
J Metzener	25-Mar-16	Rosemary Nelson	29-Mar-16
John Petroni	25-Mar-16	Neal Mock	29-Mar-16
Herman Gomes	25-Mar-16	John Livingston	29-Mar-16
Cheryl Parkins	25-Mar-16	Robert Mack	29-Mar-16
Carol Hirth	25-Mar-16	Jerry Nailon	29-Mar-16
Rosalba Cofer	25-Mar-16	Jacques Blumer	29-Mar-16
Cia Lynn	25-Mar-16	Magali Sajan	29-Mar-16
James True	25-Mar-16	Jack Van den Bogaerde	29-Mar-16
Chad Saunders	25-Mar-16	Donald Alter	29-Mar-16
Trace Elms	25-Mar-16	Jane Kwiatkowski	29-Mar-16
Nawal Tamimi	25-Mar-16	Leia Ambra	29-Mar-16
Bruce Von Alten	25-Mar-16	Susan Herting	29-Mar-16
Mark Clearwater	25-Mar-16	Thomas Brustman	29-Mar-16
Joseph Buhowsky	25-Mar-16	Stephanie Clark	29-Mar-16
Steven Schultz	25-Mar-16	Lela Nishizaki	29-Mar-16
Wes Headley	25-Mar-16	Cyd Rochford	29-Mar-16
Carol Brady	25-Mar-16	Robert Anker	29-Mar-16
Bill Britton	25-Mar-16	Mary Kaufman	29-Mar-16
Kilah Hollis	25-Mar-16	Gina Gatto	29-Mar-16

Ann Pinkerton	29-Mar-16	Melissa Funk	29-Mar-16
Francine Donner	29-Mar-16	Melynda Quinn	29-Mar-16
Lynn Armstrong	29-Mar-16	Amy Voge	29-Mar-16
Zac Pinard	29-Mar-16	Charles Binckley	29-Mar-16
Jim Alexander	29-Mar-16	Clover Seely	29-Mar-16
Cristian Cortina	29-Mar-16	Valerie Phillips	29-Mar-16
Kelli Davis	29-Mar-16	Julie Osborn	29-Mar-16
Lily Marie	29-Mar-16	Thomas Zito	29-Mar-16
Tim Hill	29-Mar-16	Karen Kirschling	29-Mar-16
Faith Strailey	29-Mar-16	Faith Boucher	29-Mar-16
Paula Defelice	29-Mar-16	Patricia Zimmermann	29-Mar-16
Richard Shannon	29-Mar-16	Julia Frisk	29-Mar-16
Coralie Carraway	29-Mar-16	William Wallin	29-Mar-16
Maria Koci	29-Mar-16	Josheph Mumm	29-Mar-16
Elizabeth Acevedo	29-Mar-16	Gregory Gordon	29-Mar-16
Cindy Warnock	29-Mar-16	David Adams	29-Mar-16
Deborah Preston	29-Mar-16	Stan Young	29-Mar-16
Howard Cohen	29-Mar-16	Maureen Besancon	29-Mar-16
Jeannie Clements	29-Mar-16	Chris Jones	29-Mar-16
D Ashurst	29-Mar-16	Mary Scibek	29-Mar-16
Byron Lerner	29-Mar-16	Joseph Wigon	29-Mar-16
Sally Maier	29-Mar-16	Jack Coombes	29-Mar-16
Cynthia Miller	29-Mar-16	Theresa Mccormick	29-Mar-16
Patrick Lewis	29-Mar-16	Lucymarie Ruth	29-Mar-16
William Beebe	29-Mar-16	Doug Musick	29-Mar-16
Dara Dungworth	29-Mar-16	Gus and Emy Pacheco	29-Mar-16
Clydell Peairs	29-Mar-16	Emily Ladner	29-Mar-16
Marjorie Krauser	29-Mar-16	Robert Webster	29-Mar-16
Michael Mitsuda	29-Mar-16	Richard Anderson	29-Mar-16
Carole Shelton	29-Mar-16	Sam Hopstone	29-Mar-16
Caroline Brawner	29-Mar-16	Elizabeth Ferguson	29-Mar-16
Sean Ebersviller	29-Mar-16	Theresa Rettinghouse	29-Mar-16
Sheratan Downie	29-Mar-16	David Britt	29-Mar-16
Linda Lux	29-Mar-16	Patti Joki	29-Mar-16
Karen Nagano	29-Mar-16	Patti Fink	29-Mar-16
Jeanne Bisbano	29-Mar-16	Janice Blumenkrantz	29-Mar-16
Michael Cooper	29-Mar-16	Sharyn Barthes	29-Mar-16
Georgina Smith	29-Mar-16	Elizabeth Deland	29-Mar-16
Sandra Morey	29-Mar-16	Gregory Rosen	29-Mar-16
Norma Hook	29-Mar-16	Lousie Chegwidden	29-Mar-16
Nancy Cunningham	29-Mar-16	Flint Sheffield	29-Mar-16
Tobey Wiebe	29-Mar-16	Lora Ferrante	29-Mar-16
Karen Wilson	29-Mar-16	Dorie Sicher	29-Mar-16
J. Chris Kidney	29-Mar-16	P Shontz	29-Mar-16
Valerie Beard	29-Mar-16	Terrie Weiss	29-Mar-16
Vaughn Miller	29-Mar-16	Donald Coburn	29-Mar-16
Steve Wednt	29-Mar-16	Janet Parkins	29-Mar-16
Phyllis Bischof	29-Mar-16	Kevin Toney	29-Mar-16
Kj Linarez	29-Mar-16	Ken Cooper	29-Mar-16
Douglas Thorley	29-Mar-16	Marjorie Boynton	29-Mar-16
William Branch	29-Mar-16	Michael Kohnen	29-Mar-16
Peggy Holmes	29-Mar-16	Stephen Brown	29-Mar-16
Lisa Nakamura	29-Mar-16	Rene Castle	29-Mar-16
Carl Ondy	29-Mar-16	Claudia Wornum	29-Mar-16
Ernie Walters	29-Mar-16	Laura Galligan	29-Mar-16
Loretta Long	29-Mar-16	Okiyo Ososaka	29-Mar-16

Richard Saunders	29-Mar-16	Jon Bazinet	29-Mar-16
Douglas Poore	29-Mar-16	Kate Hoshour	29-Mar-16
Vernon Kuska	29-Mar-16	Darrell Neft	29-Mar-16
Teresa Medena	29-Mar-16	C Yee	29-Mar-16
Frances Blythe	29-Mar-16	Robert Nauman	29-Mar-16
Deborah Ann Perkins-Kalama	29-Mar-16	Deborah Alexander	30-Mar-16
Cindy Swanson	29-Mar-16	Triss William Renard	30-Mar-16
Dana Ahlgren	29-Mar-16	Julie Cooke	30-Mar-16
Kim Fowler	29-Mar-16	James and Carol Patton	30-Mar-16
Debbie Tenenbaum	29-Mar-16	Phyllis Bischof	30-Mar-16
Dillon Caruso	29-Mar-16	Daisy Miller	30-Mar-16
Stephen Greenberg	29-Mar-16	Maryanne Glazar	30-Mar-16
Gilbert Eidam	29-Mar-16	Walter Erhorn	30-Mar-16
Jennifer Cardoza	29-Mar-16	Victor Monjara	31-Mar-16
Wendy Roberts	29-Mar-16	Diana Aridi	31-Mar-16
Prince Kuyper	29-Mar-16	Chanel Brown	31-Mar-16
Mary Adams	29-Mar-16		
Matthew Coleman	29-Mar-16		
John Grote	29-Mar-16		
George Meskus	29-Mar-16		
Howard Whitaker	29-Mar-16		
George Shanks	29-Mar-16		
Sheryl Luxon	29-Mar-16		
Mary Coleman	29-Mar-16		
Dan Anderson	29-Mar-16		
Dorothy Frantz	29-Mar-16		
Courtney King	29-Mar-16		
Marci Nunez	29-Mar-16		
Mark Van Loon	29-Mar-16		
Laura Santina	29-Mar-16		
Vicki Brenner	29-Mar-16		
Bonnie Neumann	29-Mar-16		
George Foxworth	29-Mar-16		
Elizabeth Johnson	29-Mar-16		
Bob Wellsted	29-Mar-16		
Michelle Murray	29-Mar-16		
Kevin Patterson	29-Mar-16		
Melodie White	29-Mar-16		
Sharon Haase	29-Mar-16		
Martin and Rachelle Mazar	29-Mar-16		
Elizabeth Daniels	29-Mar-16		
Reed O'Brien	29-Mar-16		
Walter Helm	29-Mar-16		
Douglas Stevenson	29-Mar-16		
Christine Wisniewski	29-Mar-16		
Martha Mcnamee	29-Mar-16		
Sue Lindgard	29-Mar-16		
Marilyn Weirich	29-Mar-16		
Diana Rebman	29-Mar-16		
Ellen Phillips	29-Mar-16		
Joann Nazworthy	29-Mar-16		
Roland Leong	29-Mar-16		
Bill Oliver	29-Mar-16		
Kathryn Hirt	29-Mar-16		
Jay Atkinson	29-Mar-16		
Carlotta Kidd	29-Mar-16		

Amy Million

RECEIVED
MAR 29 2016
CITY OF BENICIA
COMMUNITY DEVELOPMENT

From: KnowWho Services <noreply@knowwho.services>
Sent: Tuesday, March 29, 2016 12:56 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

kate hoshour
329 colusa ave
kensington, CA 94707-
katehoshour@yahoo.com
(510) 527-1351

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Friday, March 25, 2016 2:30 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I live in Sacramento and I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project. Valero is just greedy and looking out for itself; the company doesn't care if a train derails and blows up half the community. We need to be moving away from fossil fuels any way, and putting resources into finding alternative fuel sources. Don't encourage Valero by making it easy for them to run toxic trains thru the area. I don't want to blow up or breathe polluted air.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Elizabeth Fisher
660 Woodside Sierra Unit 6
Sacramento, CA 95825-
lizzyrock@sbcglobal.net
(916) 488-4582

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 6:29 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I urge the Benicia City Council to back the Planning Commission's unanimous decision to REJECT Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to REJECT Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again URGE the City Council TO REJECT Valero's oil train project, as well as its attempts to delay resolution of this issue.NO MORE DELAY!

Thank you for your consideration.

Sincerely,

Jan Summers
1521 University Ave
Sacramento, CA 95825-
summersj10@yahoo.com
(916) 927-5570

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 6:28 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

Oil trains are dangerous! To run an oil train through such a populated area is just asking for trouble! We don't want them!!
I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Jan Tache
13644 Buttercup Ct
Penn Valley, CA 95946-
tache@together.net
(530) 274-7383

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Friday, March 25, 2016 10:09 AM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

Benicia is nice to visit...but I won't be going ever again if a train might explode!

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

David Gates
23809 Maud Ave
Hayward, CA 94541-
drmindbender_eq@yahoo.com
(415) 568-5950

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Friday, March 25, 2016 3:34 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I am an epidemiologist who studies the health effects from air pollution. Crude-by-rail project is not a good idea for protecting public health given the risk of accidental spills.

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Rachel Broadwin
934 MacArthur Blvd
Oakland, CA 94610-
chezrachel@yahoo.com
(510) 625-8580

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 7:37 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

I recall incidents when I was young, when the Roseville Rail Yards area was plagued with explosions and also discovery of unexploded ordnance that had to be dealt with, and the evacuations of people near that area. Having trains carry explosives and munitions of various kinds is rather similar to carrying petroleum products and gases by train, and fracked products are particularly hazardous. Just look at what happened in Quebec. Train accidents like that are very serious, hard to deal with, and can have long term bad effects on the environment.

I live in Sacramento Country, and I don't want such trains moving through here or Roseville in Placer County, or anywhere else, either. I have passed through the Benicia area on the highway, going other places. All I can remember of what I saw in the area were the big storage tanks at refineries, unsightly, smelly and industrial in appearance. That is not something that would attract tourists or residents. It might attract people in need of work, though.

I believe that the best thing for the oil and gas industry is to do what is also best for the planet, which is to make a rapid transition to producing safe, clean, sustainable forms of energy, and phase out the petroleum and gas which are harmful to the climate, and all life on earth. They can come up with new jobs and hire people to do them. Oil and gas are on the way out. They should make the best of it and help make the new ways of dealing with energy their main focus. Otherwise, they're like the dinosaurs and other prehistoric life the gas and oil came from in the first place.

Thank you for your consideration.

Sincerely,

Mary O'Brien
5004 Barnaby Ct
Sacramento, CA 95842-
otterbridge@att.net
(916) 962-3128

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 5:11 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

As a physician, I've had the duty of caring for severely burned people in the Burn Unit. The dressing changes are so painful patients begin crying an hour before its time to change...even with large doses of narcotic painkillers and sedatives, it's a time in my career where I've never felt so helpless, so ineffective at relieving their physical and psychic suffering, yet it must be done if there's hope for survival.

I would say the same about permitting Oil Bomb trains to travel to Benicia's Valero refinery. With the expected trainloads a mile long, filled with light, volatile gasoline-like Bakken crude and heavier-than-water diluted tarsands "oil" from Canada, two inevitable scenarios come immediately to mind: the inevitable derailment and explosion of oil tanker cars, with Bakken light crude going off like dynamite, and the Tar Sands dilbit (diluted bitumen) running downhill to the waters and sinking to the bottom.

I think of the devastating environmental impact one derailment would cause: the death of sea creatures, birds and mammals up and down the entire food chain. I see the burn units of three regional hospital filled to capacity with victims with 3rd degree burns, and the excruciating recovery that awaits them, if they survive at all.

As Benicia's City council, you should listen to the unanimous Planning Commission's recommendation to reject Oil Bomb Trains. The industry knows all too well: it's not IF, but WHEN and WHERE a derailment will occur. Big Oil figures it into the risk and cost of doing business.

It is not your job to protect the outrageous profits of polluting businesses like Big Oil that have lied to us for decades about global warming caused by burning fossil fuels. They sold us out: sold out our futures, our climate, and our children's and grandchildren's future hopes of living in a world that is better than the one they were born into.

Your first and primary responsibility is to protect and sustain the welfare of the general public in your jurisdiction. We're talking about your neighbors, your friends, the firefighter who live on your block...they are your main concern.

Imagine voting to approve these Oil Bomb trains, and within 18 - 24 months you, a loved one, or a friend dies or is severely burned by a derailment, fire and explosion? Come dressing-changing time, the tears will come so quickly, you won't care about Valero....you will curse the day you put Petroleum before People. If you don't stop these Oil Bomb trains, then who will?

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Milton Bosch, M.D.
3432 Crestview Way
Napa, CA 94558-
miltonbosch@comcast.net
(707) 257-6627

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 7:41 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

STAY STRONG. DON'T GIVE IN. Your lives are worth more than an oil company's or railroads profits.

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Christine C. Jones
1029 Auburn Ct
Alameda, CA 94502-
joneschristinec@comcast.net
(510) 325-5257

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 4:56 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

We, the majority, do not want to live in a polluted, disgusting environment and have our bay destroyed by greedy, morally bankrupt oil companies. And have you seen the latest news? 2015 is the HOTTEST year on record, with 2016 to be even HOTTER! Time to say NO to fossil fuels and crank up the jobs-proving clean energy businesses. It's WAY past time. HISTORY WILL REMEMBER those who contributed to and allowed the destruction of OUR planet.

I urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris points out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again implore the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Ellen Gachesa
1249 Monticello Rd
Napa, CA 94558-
trueromanticlife@gmail.com
(111) 111-1111

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 4:55 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I strongly request the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an '"imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, please reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Sharon Morris
23693 Glenbrook Ln
Hayward, CA 94541-
skmorris101@gmail.com
(510) 999-9999

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 4:55 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

Please protect us from this dying industry.

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an '"imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Mark Garcia
5601 Marin Ave
Richmond, CA 94805-
mbglife@gmail.com
(650) 804-0000

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 4:47 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

Yes! Yes! Yes! I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an '"imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Matthew Reid
1311 Pine St
Calistoga, CA 94515-
matt.reid@att.net
(707) 360-5419

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Saturday, March 26, 2016 11:44 AM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project. THIS FEELS LIKE A REALLY DANGEROUS IDEA.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming INCREASE in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities. DO WE REALLY WANT TO PUT MORE PEOPLE AT RISK. ESPECIALLY AT A TIME WHEN WE CHOULD BE MOVING OFF OIL AND INTO RENEWABLES???

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Linnea Fronce
991 Sagamore Way
Sacramento, CA 95822-
wildart@dslextreme.com
(916) 441-6205

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Friday, March 25, 2016 9:20 AM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

I would also like to remind you that California has been a leader in the struggle to protect our climate and the environment. It should be a position of pride for all Californians and one we vigorously protect. Let's pour our energy into furthering our renewable energy resources and not destructive, old-fashioned attempts to fulfill our energy needs.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue.

Thank you for your consideration.

Sincerely,

Theodora Crawford
1812 Delaware St Apt 302
Berkeley, CA 94703-
tbcrawford@cal.berkeley.edu
(510) 548-7949

Amy Million

From: KnowWho Services <noreply@knowwho.services>
Sent: Thursday, March 24, 2016 7:26 PM
To: Amy Million
Subject: Public Comment re Valero Crude by Rail Project - Appeal Application No. 16PLN-00009

Dear Benicia City Council,

I'm writing to urge the Benicia City Council to back the Planning Commission's unanimous decision to reject Valero's proposal to transport explosive crude oil by rail through California communities to its refinery in Benicia, and to reject Valero's attempts to delay a final decision on this project.

The Planning Commission rightfully rejected this dangerous project because it "would be detrimental to the public health, safety, or welfare" of Benicians and communities along the oil train routes. The project's impacts include increased air pollution from refinery emissions (which could disproportionately affect low-income communities and communities of color) and oil spills during the offloading process (which could harm the Sulphur Springs Creek riparian corridor).

Furthermore, increases in the transportation of crude by rail has corresponded with an alarming increase in the number of derailments, spills, and explosions. More than five million Californians live in the blast zones of oil train routes, and this project would significantly increase the number of unsafe oil trains rolling through our communities.

As Attorney General Kamala Harris pointed out, the U.S. Department of Transportation found that rail shipments of highly volatile crude oil represent an "'imminent hazard," such that a "substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur." I agree with regulators, elected officials, local residents, nurses, and the the many thousands of Californians who have sounded the alarm about the unacceptable risks posed by this project.

For these reasons, I again urge the City Council to reject Valero's oil train project, as well as its attempts to delay resolution of this issue. We must move our whole economy beyond this climate changing dangerous source of energy. Lead the way!

Thank you for your consideration.

Sincerely,

Molly Brown
722 Meadow Ave
Mount Shasta, CA 96067-
mollyybrown@gmail.com
(530) 926-0986