September 15, 2014

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

Ms. Million,

The following State of California agencies appreciate this opportunity to comment on the June 2014 Valero Benicia Crude by Rail Project Draft Environmental Impact Report (Valero DEIR):[1] These comments are submitted by:

- California Public Utilities Commission (CPUC), Safety and Enforcement Division.
- California Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR).

In summary, for the reasons set forth below, the DEIR likely underestimates the risk posed by the proposed project. Among the issues of concern are the following, discussed in more detail below:

1. The length of track accounted for in the risk analysis is insufficient.
2. Derailment and accident rate calculations are problematic.
3. The cutoff point for analyzing tank car losses is insufficiently supported.
4. The risk analysis does not account for Local Safety Hazard Sites.
5. The legal enforceability of the Valero commitment to use CPC-1232 tank cars is unclear.
6. Total derailments attributable to the project, including those outside California, also should be considered.
7. Insufficient attention is paid to potential consequences.
8. Assumptions regarding the number of cars expected to derail are insufficiently explained.
9. The risk assessment does not include train accidents other than derailments.

[1] Valero Benicia Crude By Rail Project Draft Environmental Impact Report, SCH # 2013052074, Use Permit Application 12PLN-00063, June 2014.

Discussion

As described in the DEIR,

> The Project would allow the [Valero Benicia] Refinery to receive crude oil by rail...The crudes would originate at sites in North America. Union Pacific Railroad (UPRR) would transport the crudes in tank cars using existing rail lines to Roseville, California, and then to the Refinery. The Project involves the installation of a new tank car unloading rack, rail track spurs, pumps, pipeline, and associated infrastructure at the Refinery. The Project would allow the Refinery to accept up to 100 tank cars of crude oil a day in two 50 tank car trains...The Project would allow Valero to receive up to 70,000 barrels per day of the crude oil by rail.[2]

According to the project description, rail transport to the facility may include Bakken crude oil and other similarly volatile crude oils, as well as heavier crudes from Canada.[3] Apart from the risks posed by the flammable and/or toxic characteristics of these substances, the trains carrying them pose greater derailment-related risks compared with other trains. As stated in a July 2014 draft Regulatory Impact Analysis issued by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Agency (PHMSA RIA) for the PHMSA Notice of Proposed Rulemaking (NPRM) for enhanced tank car standards:

> There is reason to believe that derailments of HHFTs [High-Hazard Flammable Trains] will continue to involve more cars than derailments of other types of trains. There are many unique features to the operation of unit trains to differentiate their risk. The trains are longer, heavier in total, more challenging to control, and can produce considerably higher buff and draft forces which affect train stability. In addition, these trains can be more challenging to slow down or stop, can be more prone to derailments when put in emergency braking, and the loaded tank cars are stiffer and do not react well to track warp which when combined with high buff/draft forces can increase the risk of derailments.[4]

The combination of risks posed by the contents of these trains, and their vulnerability to derailments, makes it essential that the environmental documentation for projects that potentially entail large numbers of crude-by-rail shipments receives careful review.

The Valero DEIR states the following:

> In order to identify the probability of an accidental release of crude oil from a Valero train, the City retained Dr. Christopher Barkan to conduct a quantitative assessment. Dr. Barkan is Professor and Executive Director of the Rail Transportation and Engineering Center at the

---

[2] Ibid., p. 1-1.

[3] Ibid., p. 4.7-18; Table 3-1, p. 3-23; "Thus, the project could foreseeably result in Valero's purchase of any of the crudes listed above as well as others that might become available," ibid., p. 3-24.

[4] Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Draft Regulatory Impact Analysis, Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains; Notice of Proposed Rulemaking, Docket No. PHMSA-2012-0082 (HM-251), July 2014, p. 24. The NPRM itself was published in the Federal Register on August 1, 2014 ("Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains," 79 FR 45015). The NPRM defines a HHFT as a train comprised of 20 or more carloads of a Class 3 flammable liquid, which includes the trains and crude oils that would be shipped under the proposed project.

Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. He and his colleagues prepared a report that is attached hereto as Appendix F.

The annual rate of crude oil release accidents on the route between Roseville and Benicia was estimated. Consistent with recent industry practice a release event in which a tank car loses more than 100 gallons of crude oil was considered significant. It was assumed that the Refinery would use 1232 Tank Cars for all shipments, based on Valero's commitment to do so. The risk analysis took into account major risk factors, including the route's FRA [Federal Railroad Administration] track class, method of operation, tank car safety design and the proposed volume of petroleum crude oil traffic over the route.

The estimated risk of an accident resulting in a release of more than 100 gallons is approximately 0.009 per year, which corresponds to an estimated frequency of occurrence of once per 111 years. The risk of a release along the portion of the route traversing the Suisun wetland area has an even lower annual risk of 0.00381, which corresponds to an estimated frequency of once per 262 years.

According to the report, these risk estimates are probably conservative, meaning that they probably overstate the actual risk. This is because the rate of hazardous materials releases from trains has declined since the rate estimates were developed; the accident rate has been declining for decades, and this trend will likely continue based on continued investment in infrastructure and new safety technologies; the analysis does not take into account the safety practices adopted by AAR earlier this year. In addition, the pending PHMSA rulemaking could result in new tank car standards that are even more stringent than those for 1232 Tank Cars.[5]

This passage mischaracterizes and underestimates the risk posed by the oil shipments by rail that would be a consequence of the proposed project.

1. The length of track evaluated and the routes identified in the DEIR are insufficient. The Valero DEIR limits its rail accident risk analysis (Appendix F, "Railroad Crude Oil Release Rate Analysis for Route between Roseville and Benicia") to the 69-mile train route between Roseville and Benicia. However, as stated in Chapter 3, Project Description:

The crude oil to arrive by tank car would originate at sites in North America and be shipped by Union Pacific Railroad (UPRR). UPRR would transport tank cars on existing rail lines from sources in North America to Roseville, California, where the cars would be assembled into a train for shipment into the Refinery.[6]

However, for the shipments to get to Roseville, they would travel through considerably more mileage in California, from the border entry point to Roseville. Limiting the mileage analyzed only to the Roseville-Benicia segment underestimates the accident risk, as discussed further below. In contrast, the DEIR's analysis of greenhouse gas emissions factors in track lengths between Roseville and the California state line,[7] which is more consistent with the CEQA EIR

[5] Valero DEIR, p. 4.7-18.

[6] Ibid., pp. 3-1 - 3-2.

[7] "Because there is uncertainty regarding the exact route(s) that the crude by rail trains would use to enter the state and arrive at the Roseville rail yard, an average of the track length between the Roseville rail yard and the Nevada state line and the track length between the Roseville rail yard and the Oregon state line (approximately 195 miles of mainline track) was used, to estimate in-state GHG [greenhouse gas] emissions from large line haul." Ibid., p. 4.6-9.

requirements to identify all impacts that otherwise would not exist without the project.[8] It is unclear why a different metric is used regarding derailments resulting in oil releases.

There are a variety of routes through California to Roseville, each with different track mileages, depending on where the trains originate. The greenhouse gas analysis in the DEIR uses a figure of 195 miles of mainline track, apparently based on an average of an east-west route and a north-south route.[9] As no calculations are presented, it is unclear how this figure was derived. (See Attachment 1 for examples of routes that trains to Roseville could take, ranging in length from approximately 119 miles to 298 miles for routes through northern California).

In addition, the project description identifies Texas and other locations as possible sources of crude. From many of those locations, the most direct routes would be through southern California. Those routes are not analyzed in the DEIR.[10] Attachment 1 to this document presents examples of southern routes, which range in length between approximately 607 miles and 705 miles.

The project description states that "existing rail lines" would be used by UPRR. Previous shipments of crude oil through California proceeded on track owned by BNSF Railway, and the project description does not rule out shipments conveyed by UPRR on BNSF-owned track. Similarly, it is unclear why BNSF is ruled out as a carrier of crude oil to the facility. Routes on BNSF track should also be analyzed. See Attachment 1 for an additional northern California route of approximately 371 miles and a southern California route of approximately 656 miles.

Lastly, as described in Attachment 1, it is unclear why Appendix F assumes that trains would have to proceed to Roseville rather than directly to Benicia. In some cases, for both northern and southern routes, it would be more efficient for shipments to proceed directly to Benicia.

CEQA requires that the whole of a project be described and analyzed. CEQA Guidelines § 15378(a) defines "project" as follows:

> "Project" means the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is any of the following: [subsections omitted]

The definition includes all phases of a project that are reasonably foreseeable, and all related projects that are directly linked to the project. Analyses of environmental impacts, including the risk and consequences of derailments, should not be limited to the section of track between Roseville and Benicia, and track at the refinery itself. The analyses should also cover the many miles of track, the distance of which will vary depending on entry point into the state, between the state border and Roseville. The additional mileage logically would result in several times the

---

[8] *See* Cal. Code of Regs. § 15126.2.

[9] Valero DEIR, p. 4.6-9.

[10] *See* Cal. Code of Regs. § 15126.6 (EIR must discuss and analyze all project alternatives).

accident rate stated in the document. Using the DEIR's methodology, Attachment 2 presents calculations of annual risk and average incident rates based on several scenarios of in-state travel, without taking into consideration the concerns with this methodology detailed in the other portions of this comment letter. In addition, derailments outside of California should be considered (see #6, below).

2. The DEIR's derailment and accident rate calculations are problematic. The DEIR states:

> The report also compared the likelihood of an accident involving a Valero train travelling from Roseville to Benicia with the likelihood of automobile accidents, based on recent US federal data on highway safety in terms of incidents per million vehicle miles traveled. The risk of a motor vehicle accident is 22 times higher than the risk of a Valero train release. Considered on an annual basis, the average US driver is 6.3 times more likely to be involved in a motor vehicle accident, and 1.9 times more likely to be involved in an accident involving injuries or fatalities, than the occurrence of a release incident on the Roseville to Benicia route.[11]

There is no explanation of why automobile accidents constitute an appropriate comparison with railroad accidents, especially as all automobile accidents are being compared with the small subset of train accidents causing a release of more than 100 gallons. If automobile accidents are to be compared with train accidents, a better basis of comparison is the total train accident rate for Class 1 railroads, excluding Amtrak, which was an average of 3.15 per million miles for the ten-year period 2004-2013, and an average of 2.50 for the three year period 2011-2013.[12] The automobile accident rate comparison is inappropriate. Automobiles do not carry large volumes of hazardous substances, and are not being considered as an alternate means of conveying crude oil to Valero. The DEIR should not use such an incomparable metric.

In addition, regarding fatalities and injuries, the DEIR does not give specific estimates that would be associated with the proposed shipments, irrespective of whether or not oil is released by an accident. Considering train accidents alone for Class 1 railroads, excluding Amtrak, the fatality rate was an average of 0.011 per million miles for the ten-year period 2004-2013, and an average of 0.010 for the three year period 2011-2013. The injury rate was an average of 0.195 per million miles for the ten-year period 2004-2013, and an average of 0.093 for the three year period 2011-2013.[13]

---

[11] Valero DEIR, p. 4.7-18.

[12] Calculations based on Federal Railroad Administration, Office of Safety Analysis website, http://safetydata.fra.dot.gov/officeofsafety/default.aspx, Table 1.12, "Ten Year Accident /Incident Overview, Class 1 Railroads (Excluding Amtrak)," for 2004-2013. As defined by FRA, "A train accident involves one or more railroads that have sustained combined track, equipment, and/or structures damage in excess of the reporting threshold. The reporting threshold, adjusted annually, is currently $10,500 (2014). The computed accident damage only includes the loss and/or repair of cars and locomotives, repair of signal systems and other structures, and repair of roadbed and track. Not included in this calculation are the costs associated with clean-up, hazmat clean-up (support from fire department and other groups), loss of lading, societal damage (e.g., closing a business area during clean-up), loss of life or injury, loss of use of main line track, and loss of use of equipment/locomotives." Federal Railroad Administration, Office of Safety Analysis, "Railroad Safety Data Frequently Asked Questions (FAQ)," nd.

[13] FRA Table 1.12.

It should be noted that the above figures do not include accidents, fatalities, and injuries attributable to collisions with trespassers, highway-rail incidents (i.e., accidents at crossings), and certain other accident causes.[14] If all such accidents and incidents in the U.S. are included, the total accident/incident rate for Class 1 railroads, excluding Amtrak, was an average of 11.89 per million miles for the ten-year period 2004-2013, and an average of 9.98 for the three year period 2011-2013. Fatality and injury rates are more difficult to calculate, but considering both main and yard track mileage, appear to be as follows: the fatality rate was an average of 0.801 per million miles for the ten-year period 2004-2013, and an average of 0.711 for the three year period 2011-2013. The "non-fatal condition" rate was an average of 6.04 per million miles for the ten-year period 2004-2013, and an average of 5.07 for the three year period 2011-2013.[15]

Next, considering derailment rates alone, it is difficult to verify the derailment rate applied in Appendix F. The authors do not present their data set. A reference is provided to "Liu (2013)," which apparently refers to a dissertation from the University of Illinois that does not appear to be available on-line. Further, the derailment rate of 0.37 per million train miles given in Appendix F is low, compared with nationwide derailment rates of 0.98 in 2011, 0.78 in 2012, and 0.86 in 2013 on main line track, for an average of 0.87 per million train miles.[16] As a result, further discussion of the derivation of the 0.37 rate is needed. Even if the 0.37 derailment rate for the Roseville-Benicia track segment is correct, the DEIR must either use an FRA nationwide rate for other portions of crude-by-rail routes, with further modifications as detailed elsewhere in this comment letter, or explain why the 0.37 rate would still apply.

Accidents are rare events, and the more severe the accident, the rarer it is, even though those accidents are unacceptable. Estimating a reliable rate of rare events requires a large sample size. For example, if the DEIR estimate depended on a sample of a few years and a small stretch of track, it would very likely find few derailments. The estimated derailment rate would thus be subject to a dramatic change if there was one more or one less accident. Without further information here, it is not possible to have confidence in the DEIR's conclusions.

3. The cutoff point for analyzing tank car losses is insufficiently supported. The DEIR's statement "Consistent with recent industry practice a release event in which a tank car loses more than 100 gallons of crude oil was considered significant"[17] has insufficient justification, and no citation is given for the statement. A citation in Appendix F refers to joint Association of American Railroads/American Short Line Railroad Association comments to PHMSA made in

[14] Casualties to non-U.S. communities such as the 47 fatalities in Lac-Mégantic, Canada, also are not included.

[15] FRA Table 1.12.

[16] Federal Railroad Administration, Office of Safety Analysis website, Table 2.09 "Train Accidents and Rates," queried for derailments on main line track, all track classes. It is unlikely that the mix of track classes described in Appendix F as existing between Roseville and Benicia, where almost 80 percent of track is Class 5, would apply in most other areas of California, or on a national basis. The dominant class for main-line track used in passenger and long-haul freight service is Class 4. Class 4 track accounts for a much higher percentage of total derailments (32.3 percent for the period 2010-2013, the highest percentage of any track class) than Class 5 track (9.2 percent for the same period).

[17] Valero DEIR, p. 4.7-17.

2013; however, these comments do not provide justification for a 100 gallon figure as a risk assessment measurement, merely stating that

> Two different CPRs [conditional probability of release] are shown: the CPR for releases on main lines, and the CPR for releases on a main line of more than 100 gallons. The latter is the most relevant to this discussion and will be the CPR referred to in the remainder of these comments. The concern over catastrophic accidents relates to transportation on main lines with significant releases.[18]

There are no California or Federal regulatory requirements that specify a 100 gallon minimum before a release must be reported. For example, California Public Utilities Code Section 7672.5 states:

> Any railroad corporation which is involved in an incident resulting in a release, or threatened release, of a hazardous material shall immediately report the type and extent of the release or threatened release in the manner specified in Section 25507 of the Health and Safety Code.

CPUC General Order 161 states in part:

> 3.1 Each railroad shall immediately notify by telephone the appropriate ERA [emergency response agency] of any incident, as defined in Rule 2.6, in addition to other any federal and state reporting requirements.
>
> 2.6 "Incident" means any condition involving a release or threatened release of hazardous materials where there is a reasonable belief that the actual or threatened release poses a significant present or potential harm to persons, property or the environment.
>
> 2.3 "Emergency response agency" ("ERA") means the fire department or district or other public agency with responsibility for responding to an emergency occurring in the area of an incident.

The physical characteristics of Bakken oil and similar crudes can pose sufficient present or potential threats to trigger these and other state and federal notification requirements in the event of releases of less than 100 gallons. Given its high volatility, and the expected ignition sources in a derailment, a spill of less than 100 gallons of Bakken oil still poses a risk of an uncontrollable fire that could then compromise adjacent tank cars. The DEIR's risk assessment should include an analysis of the relationship of spill volume to the likelihood of the most volatile crude oils igniting, and base its analysis on volumes likely to ignite.

Without a determination of the likelihood of different spill volumes igniting, the DEIR's risk assessment should consider all reportable releases when forecasting the risk of fire and explosion as well as when forecasting the pollution risk from spills, whether or not fire occurs.

4. <u>The risk analysis does not account for Local Safety Hazard Sites</u>. Analyses based on length of track alone do not capture total risk. Before reaching Roseville or Benicia, no matter what the

[18] Association of American Railroads and American Short Line Railroad Association (AARASLRRA) 2013. Comments on Docket No. PHMSA-2012-0082: Hazardous Materials: Rail Petitions and Recommendations to Improve the Safety of Railroad Tank Car Transportation (RRR), pp. 3-4.

originating locations of the shipments, these trains would travel over one or more portions of track in California that are classified as Local Safety Hazard Sites by CPUC.[19] These sites consist of steep grades and tight curves, and also have historically high frequencies of derailments, which provide additional evidence of their hazardous nature. As described in California Public Utilities Code § 7711,

> Factors that the [California Public Utilities] commission shall consider in determining a local safety hazard may include, but need not be limited to, all of the following:
> (1) The severity of grade and curve of track.
> (2) The value of special skills of train operators in negotiating the particular segment of railroad line.
> (3) The value of special railroad equipment in negotiating the particular segment of railroad line.
> (4) The types of commodities transported on or near the particular segment of railroad line.
> (5) The hazard posed by the release of the commodity into the environment.
> (6) The value of special railroad equipment in the process of safely loading, transporting, storing, or unloading potentially hazardous commodities.
> (7) The proximity of railroad activity to human activity or sensitive environmental areas.

Local Safety Hazard Sites account for a disproportionate share of derailments occurring in California. For example, analysis of the 1976 - 1991 accidents reviewed by the CPUC after the 1991 Dunsmuir derailment and spill showed that the derailment rate for a track segment covering Local Safety Hazard Site areas in the Feather River Canyon (Keddie to Tunnel 8 segment), was five times the derailment rate for the Benicia to Roseville segment.[20] The CPUC's Local Safety Hazard Sites analysis has predictive power. For example, for the period 2003 through 2013, although constituting two percent of track, eighteen percent of derailments took place on tracks designated as being within Local Safety Hazard sites identified by statistical analysis of derailment likelihood by location.

The DEIR risk analysis should consider the additional risks posed by Local Safety Hazard sites on the track segments that would be used by the train shipments resulting from the project. In northern California, this might include local safety hazard sites on the UPRR Roseville, Valley, and Canyon Subdivisions. In southern California, this might include sites on the UPRR Yuma and Mojave Subdivisions. BNSF tracks also pass through local safety hazard sites, e.g., in the BNSF Gateway Subdivision in the north and Cajon Subdivision in the south. Given that all routes to Benicia include at least one of these local safety hazard sites, and given that these sites have a derailment rate over ten times that of other track,[21] the DEIR significantly underestimates the risk.

---

[19] Several Local Safety Hazard Reports prepared by CPUC, along with other reports and relevant resources, may be viewed at http://cmsserver/PUC/safety/Rail/Railroad/.

[20] In the 1976 – 1991 analysis, there were 1.47 accidents per mile in the Feather River Canyon segment (Keddie to Tunnel 8), compared with 0.28 accidents per mile on the track segment between Roseville and Benicia. The Feather River segment is 49 miles and had 72 derailments. The Benicia-Roseville segment is 75 miles and had 21 derailments.

[21] As stated earlier, 18 percent of derailments occurred in 2 percent of track identified as local safety hazard sites through statistical analysis of historical derailment location, and thus the remaining 82 percent of derailments occurred in the 98 percent of track outside these sites. This equates to a rate 10.7 times greater in the local safety hazard sites than on other trackage.

5. The legal enforceability of the Valero commitment to use CPC-1232 tank cars is unclear. The DEIR states:

> Valero would comply with all legal requirements applicable to the transport of crude oil by rail, including all tank specification requirements. In one respect, however, Valero would exceed legal requirements. Valero has committed that, when the PHMSA regulations call for use of a DOT-111 car, Valero would use 1232 Tank cars rather than legacy DOT-111 cars. [22]

It is uncertain how this commitment would be enforced, in light of the fact that federal law governs regulation of rail cars. Would the City of Benicia bring suit against Valero if a DOT-111 tank car was used by UPRR? Also, the ability of UPRR to restrict shipments to CPC 1232 tank cars is unclear, given the small numbers of these cars and prevalence of older DOT-111 tank cars currently in service, as well as the certainty of competing demands for the more modern cars. Without a guarantee that newer model tank cars would be used, and as long as federal regulations permit the use of DOT-111 cars to transport crude oil, the risk analysis should include calculations based on the use of older model cars, absent binding and enforceable authority to ensure the use of CPC 1232 tank cars.

6. Total derailments attributable to the project, including those outside California, also should be considered. As stated earlier, the DEIR risk analysis is based on track mileage between Roseville and Benicia. Apart from including the distance to Roseville from the California state border, as discussed above, the risk analysis should also include the distance from the shipment origins in other states.

The DEIR indicates that for some purposes, the project includes oil shipments through other states and Canada. The chapter on greenhouse gas emissions considers operational emissions outside of California, including locomotive emissions.[23] The Air Quality chapter states:

> As explained above, if the Project were approved and constructed, Project-related trains would travel between oil field locations in North America and the Roseville Yard. These trains would cause an increase in locomotive emissions.[24]

Air quality impacts outside of listed California air district jurisdiction boundaries are termed "difficult to predict given the speculative nature of the exact rail routes that would be used to transport the crude oil" to the Roseville Yard.[25] However, predictions of high-hazard fuel train accident rates have been made on a nation-wide basis by PHMSA, and these can be extrapolated to the shipments that would be made under the proposed project, at least regarding the U.S.-portion of these trips.

---

[22] Valero DEIR, pp. 3-19 – 3-20.

[23] Ibid., p. 4.6-13.

[24] Ibid., p. 4.1-20.

[25] Ibid., p. 4.1-12.

The July 2014 PHMSA RIA, which analyzes both crude oil and ethanol derailments, bases its analysis on carloads shipped rather than miles traveled:

> To estimate the number of derailments associated with the movement of flammable liquids, we used FRA's Derailment Database and the Public Waybill Sample to develop an 18-year historical series on annual derailments per million rail carloads, across all commodities. The Surface Transportation Board (STB) collects cargo waybill data under the requirements that all U.S. railroads that terminate more than 4,500 revenue carloads must submit a yearly sample of terminated waybills. This information provides an indication of the volume of freight rail traffic. We combined these figures with data obtained through rail accident and incident reports submitted to FRA on from Form FRA F 6180.54, "Rail Equipment Accident/Incident Report" to develop derailment rates. [26]

The RIA notes several difficulties in projecting accident rates. For example, in discussing current derailment rates, it states "Due to limitations in the reported data, it is impossible to isolate the derailment rate of only crude oil and ethanol trains."[27] Still, the RIA was able to project mainline derailments per annual carloads of crude oil and ethanol from 2015 through 2034, assuming the absence of implementation of the measures called for in the NPRM. These range from a high of 14.36 derailments for 898,500 carloads in 2015, to a low of 5.16 derailments for 755,613 carloads in 2034.[28] The RIA estimates that the same number of accidents would occur even if the NPRM measures were adopted; however, their adoption would prevent the equivalent of ten additional high consequence accidents from occurring.[29]

Valero would accept up to two unit train shipments of 50 tank cars each, or 100 tank cars of crude oil a day, 365 days a year,[30] or 36,500 carloads. At the derailment rate estimated by the RIA for 2015, about 0.000016 per carload, this would be equate to about 0.58 derailments per year, or more than one derailment every two years. At the low end of estimates, for 2034, the derived derailment rate would be about 0.000007 per carload. For Valero's 36,500 carloads, this would equate to about 0.26 derailments per year, or about one every four years.

7. Insufficient attention is paid to potential consequences. It is reasonable to assume that the average quantity of petroleum that would be released from such derailments would at least equal and likely exceed the cutoff point of 100 gallons per release used by the DEIR. Although the RIA does not project the average loss of contents per derailment, noting that the PHMSA hazardous material incident report database often contains inaccuracies, it presents evidence that historically, many derailments have resulted in large releases:

---

[26] PHMSA RIA, p. 21.

[27] Ibid.

[28] Ibid., Table B3, "Projected Carloads of Ethanol and Crude and Mainline Derailments,", p. 24.

[29] "The high end of the range of estimated benefits includes the same estimate of 5 to 15 annual mainline derailments predicted based on the U.S. safety record, plus an estimate that the U.S. would experience the equivalent of 10 additional safety events of higher consequence—nine of which would have environmental damages and monetized injury and fatality costs exceeding $1.15 billion and one of which would have environmental damages and monetized injury and fatality costs exceeding $5.75 billion—over the next 20 years. This outcome could result from a smaller number of more severe events, or more numerous events that are less severe." Ibid, pp. 4 - 5.

[30] Valero DEIR, p. 3-1.

> For the time period between 2006 and 2013 we identified 40 mainline derailments that resulted in the release of 3,344,081 gallons of crude oil and ethanol for an average of approximately 83,602 gallons released per mainline track derailment.[31]

Total fatalities and injuries also can be estimated using the rates presented in #2, above, depending upon the originating destinations of crude shipments. For example, there are roughly 1,700 miles of track between Williston, North Dakota and Benicia, taking a northern route using both BNSF Railway and UPRR track. (The California portion of these trips would be approximately 375 miles, or about 22 percent.) If all 730 unit train shipments during one year came from this location, one-way trips would total 1,241,000 miles. As stated earlier, for FRA-reportable train accident rates for Class 1 railroads, excluding Amtrak, the fatality rate was an average of 0.011 per million miles for the ten-year period 2004-2013, and an average of 0.010 for the three year period 2011-2013. The injury rate was an average of 0.195 per million miles for the ten-year period 2004-2013, and an average of 0.093 for the three year period 2011-2013. Multiplying these figures by 1.241, annual fatalities would be 0.014 (using the ten-year average) and 0.012 (using the three-year average), and annual injuries would be 0.242 (using the ten-year average) and 0.115 (using the three-year average).). If rates based on all accident and incident causes were to be considered, these totals would be much higher.

Derailments also can be estimated under this scenario, producing a higher number than that forecasted above using the PHMSA methodology. 1,241,000 miles of train travel would equate to 1.08 derailments per year, using the nationwide 2011-2013 average of 0.87 derailments per million miles.

These expected fatality, injury, and derailment estimates do not address the dangerous nature of the crude oil commodity, and only include estimates based on an increase in train traffic. The potential for tragic consequences of crude oil tank car ruptures would likely raise the impact figures considerably, and should be part of the DEIR's risk analysis.

8. Assumptions regarding the number of cars expected to derail are insufficiently explained. The DEIR analysis uses the median for number of cars expected to derail (six), rather than the average of ten from the same study.[32] In accident distributions such as these, the average is generally higher than the median. For example, examining FRA-reportable derailments on a nationwide basis in 2013 for the two Class 1 railroads that operate in California, Union Pacific's average number of cars derailing per train was 11.5, whereas the median number of cars derailing was 7, and BNSF's average number of cars derailing per train was 9.0, whereas the median number of cars derailing was 6.[33] The combined average for UPRR and BNSF was 10.4,

---

[31] This was the total number of relevant derailments identified on mainline track. Figures did not include yard derailments and release incidents that did not result from derailments. PHMSA RIA, p. 25-26, and Appendix B.

[32] Liu, X., M.R. Saat, C.P.L. Barkan and X. Qin 2013. "Analysis of U.S. freight-train derailment severity using zero-truncated negative binomial regression and quantile regression," Accident Analysis and Prevention 59: 87–93.

[33] Time did not permit the inclusion of more years. However, even this smaller sample makes the point, and it has the added advantage of being more up-to-date than the DEIR's analysis. A list of derailments from the FRA's website were analyzed for freight trains on main line track for UPRR and BNSF for 2013, Table 3.18, "Accident by State/Railroad." Duplicate records for instances when the track maintenance was performed by a different railroad

while the median was 7. Generally, the average is considered the best predictor of future events. No real justification was provided for using the lower median figure. The DEIR's risk analysis cites a research paper when presenting its decision to use the median, but for several reasons that paper does not justify its use.[34] The cited research paper's purpose was to construct predictive formulas for targeting maintenance efforts to prevent only derailments, and not collisions and other accidents. While the use of the median in those statistical applications may be justified, no justification is provided for its application in the DEIR. In fact, the paper cites several other studies that have used the mean.[35] Thus the use of the median in the DEIR's risk estimate raises concerns about underestimation of risk. This is especially a concern with oil trains, as presented earlier in these comments.[36]

As a statistic to describe a sample's characteristics the median can be less sensitive to rare but extreme values. However, there is no discussion of whether this was the case here, or if the use of the median was appropriate instead of the average. Our view is that without justification otherwise, the average is a better estimator of cars expected to derail, and to the extent that it may be sensitive to rare but unusually large values (statistically called "outliers"), that sensitivity has no real impact, and that "outlier" information is important as well.

For example, the only likely outlier in 2013 data from the four major Class 1 railroads in the U.S. (UPRR, BNSF Railway, CSX, and Norfolk Southern) was a CSX train that lost its brakes down a steep grade and derailed 73 cars. Historically that has been a concern in California given its steep mountain grades, and remains a concern especially with trains with a high ratio of tons per operative brake, such as these crude oil trains have. And even if the CSX "outlier" was removed from this data, the average only drops from 10.06 to 9.78. Given the reliability of the mean in this data, our results from the 2013 data, and the results from the Liu study, a mean of 10 should be used in the expected number of cars to derail in a derailment. The DEIR should either use this higher number, or provide convincing justification for why it should not be used when it attempts to reliably describe the experience of these Class 1 railroads.

9. The risk assessment does not include train accidents other than derailments. According to the Liu paper referenced in the DEIR for the accident rates and expected number of cars to derail in an accident, derailments accounted for only 72 percent of train accidents.[37] This results in two sources of underestimation in the analysis. First, it underestimates the expected frequency of accidents, and, second, it does not account for the number of derailed cars in train collisions.[38]

---

were deleted, as were passenger trains, yard jobs, and maintenance of way equipment derailments. Instances where one train derailed and caused cars to derail on another train were counted as one derailment with the total cars derailed on both trains. Consistent with the Liu, et al., (2013) paper, "cars" included derailed locomotives as well.

[34] Liu, et al., (2013).

[35] Ibid., p. 88.

[36] See footnote 4 and the discussion on the first page of this letter.

[37] Liu, et al., (2013), p. 87.

[38] "Train collisions and highway–rail grade crossing accidents have been analyzed in other recent studies, so this research focused on train derailments." p. 155, Liu, X., Saat, M.R., Barkan, C.P.L., 2012. "Analysis of causes of major train derailment and their effect on accident rates," Transportation Research Record 2289, 154–163; Liu, et al., (2013), p. 87, 89.

While the increase in frequency is relatively small, estimated as 6 percent of train accidents, it still raises the value needed in the DEIR analysis. Additionally, a check of 2013 data indicates that the severity was much higher for collisions on mainline. Illustrating this, 2013 data for the four largest Class 1 railroads shows a range of 11 to 54 derailed cars per collision, with a mean of 24.4 and a median of 21.5. Adding the collision data to the derailment data raises the mean from 10 to 10.5 cars derailed for the 2013 combined set. Although this is a relatively small sample, the results further illustrate that the Liu, et al., studies were developed for a different purpose and thus questions those studies' relevance to the DEIR project risk analysis.

CONCLUSION

Based on the foregoing, we believe that the DEIR underestimates accident and derailment risk and does not sufficiently evaluate a number of factors that are relevant to those risks. Thus, the DEIR is insufficient to comply with CEQA's mandates to thoroughly analyze all project impacts. We urge you to redo the analysis based on these factors. Thank you for your consideration. Please let us know if we can provide any additional information.

Sincerely,

Denise Tyrrell, Acting Director
Safety and Enforcement Division
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

Sincerely,

Thomas M. Cullen, Jr., Administrator
Office of Spill Prevention and Response
California Department of Fish and Wildlife
1700 K Street, Suite 250
Sacramento, CA 95811

ATTACHMENT 1

CPUC staff calculated approximate distances that oil trains would travel from various locations on the California border to Roseville, and from the California border directly to Benicia.[39] These estimates indicate the additional mileage that should be considered in the DEIR's analysis of risk from the proposed project.

Three possible routes for trains from the Bakken region to enter northern California on UPRR track and reach Roseville are listed below. Crude from Canadian sources could follow one or more of the routes as well.

A. Entering California on the UPRR-owned Roseville Subdivision near the southeast corner of Sierra County and passing through Nevada and Placer Counties to Roseville (a total of approximately 119 miles from the state line to Roseville).

B. Entering California on the UPRR-owned Winnemucca Subdivision near Herlong in Lassen County, switching to the UPRR-owned Canyon Subdivision in Plumas County, switching to the UPRR-owned Sacramento Subdivision near Oroville in Butte County, switching to the UPRR-owned Valley Subdivision near Marysville in Yuba County, arriving in Roseville in Placer County (a total of approximately of 229 miles from the state line to Roseville).

C. Entering California on the UPRR-owned Black Butte Subdivision near Dorris in Siskiyou County, switching to the UPRR-owned Valley Subdivision, entering Shasta, Tehama, Butte, Yuba, and Placer Counties to Roseville (a total of approximately 297 miles from the state line to Roseville).

As stated in the text, it is unclear why Appendix F assumes that trains would have to proceed to Roseville rather than directly to Benicia. In some cases, for both northern and southern routes, it would be more efficient for shipments to proceed directly to Benicia. In particular, the list of possible sources of crude oil in the project description includes crude from southwestern U.S. sources, such as Texas, and the most direct routes for such shipments would be through southern California to Benicia. For the routes from southern California (D, E and G below), trains can only get to Roseville by going first to Sacramento, and then turning northeast. With Roseville as the destination, these shipments would then have to backtrack from Roseville through Sacramento on the way to Benicia, adding approximately 30 miles to the total trip.

Possible UPRR routes going directly to Benicia from southern California include:

D. Entering California on the UPRR-owned Yuma Subdivision near Winterhaven in Imperial County, passing through Riverside and San Bernardino Counties, switching to the UPRR-owned Mojave Subdivision near San Bernardino, entering Los Angeles and Kern

[39] Note: Appendix F based its calculations on a distance of 69 miles between Roseville and Benicia. It is unclear how this figure was arrived at. In CPUC staff's calculation, the mileage from Roseville (milepost 106.4) to Benicia (milepost 34.5) is 72 miles. The trains would go through Placer, Sacramento, Yolo, and Solano Counties on the UPRR-owned Martinez Subdivision.

Counties, switching to the UPRR-owned Fresno Subdivision near Bakersfield, passing through Tulare, Fresno, Madera, Merced, Stanislaus, San Joaquin, and Sacramento Counties before switching to the UPRR-owned Martinez Subdivision near Sacramento, and going through Yolo and Solano Counties to arrive at the Valero facility in Benicia (a total of approximately 705 miles from the state line to Benicia).

E. Entering California on the UPRR-owned Cima Subdivision near Nipton in San Bernardino County; switching to the BNSF-owned Needles, Cajon, and Mojave Subdivisions; switching to the UPRR-owned Mojave Subdivision in San Bernardino County; and switching to the UPRR-owned Fresno Subdivision in Kern County near Bakersfield. For the rest of the trip to Benicia, the same route used in Route D above would be used (a total of approximately 607 miles from the state line to Benicia).

For trains from northern California, an alternate route that would bypass Roseville and go directly to Benicia for Route B above would be to stay on the Sacramento Subdivision through Yuba, Sutter, and Sacramento Counties to Sacramento and then proceed to Benicia on the Martinez Subdivision, which would save approximately 10 miles on the overall trip to Benicia and associated travel time. Similarly for Route C, trains could switch to the Sacramento Subdivision at Marysville, go directly to Sacramento, and then proceed to Benicia on the Martinez Subdivision, saving approximately 11 miles on the overall trip to Benicia and associated travel time.

Lastly, as stated in the text, routes on BNSF track should also be analyzed. Two additional possible routes, on BNSF track, are:

F. From the north, entering California on the BNSF-owned Gateway Subdivision near Stronghold in Modoc County, going through Lassen and Plumas Counties before switching to the UPRR-owned Canyon Subdivision near Keddie, traveling through Butte County, and switching to the UPRR-owned Sacramento Subdivision near Oroville. After this, the same route described in the Route B alternate could be used (a total of approximately 375 miles from the state line to Benicia).

G. From the south, entering California on the BNSF-owned Needles Subdivision near Needles in San Bernardino County, switching to the BNSF-owned Cajon Subdivision near Barstow, switching to the BNSF-owned Mojave Subdivision near Barstow, proceeding into Kern County, switching to the UPRR-owned Mojave Subdivision near Mojave, switching to the BNSF-owned Bakersfield Subdivision near Bakersfield, proceeding into Tulare, Kings and Fresno Counties, switching to the BNSF-owned Stockton Subdivision near Fresno, going through Madera, Merced, Stanislaus and San Joaquin Counties, switching to the UPRR-owned Fresno Subdivision near Stockton, going into Sacramento County, switching to the UPRR-owned Martinez Subdivision near Sacramento, and going through Yolo and Solano Counties to the Valero facility in Benicia (a total of approximately 656 miles from the state line to Benicia).

ATTACHMENT 2

Appendix F of the DEIR states (p. 7):

> The annual train release rate on this route [between Roseville and Benicia] is 0.00903, which corresponds to an expected interval between release incidents of approximately once per 111 years of operation (1/0.00903).

A release incident is defined as exceeding 100 gallons (p. 10):

> The results show that the expected occurrence of a crude oil train release incident exceeding 100 gallons between Roseville and Benicia is approximately 0.009 per year, or an average of about once per 111 years.

Because additional mileage should be factored into the risk analysis, the 111 year figure is too low. It can be scaled up according to the increased mileages shown in Attachment 1. As it is impossible to predict what percentage of oil shipments -- two unit trains a day, 365 days a year -- would follow any particular route, either to Roseville or directly to Benicia, an alternate figure cannot be presented with any certainty.

However, it is possible to set boundaries on likely incident rates, using the DEIR methodology. The following are incident probabilities and average incident rates if *all* of the trains followed any *one* of the particular routes. The actual figure likely would be a weighted average of several of these routes, and likely would vary each year. Note: the table does not take into account the concerns with the DEIR methodology described previously in this comment letter. For example, if, as is likely, a higher derailment rate is applicable, or if a lower amount than 100 gallons is used as a cutoff point, the average incident rate would be higher.

Risk of Derailment Resulting in Release of More than 100 gallons of Crude Oil
(Assuming All Shipments Follow a Given Route)

ROUTE	MILES	ANNUAL INCIDENT PROBABILITY	AVERAGE INCIDENT RATE
Roseville to Benicia	69*	0.00903	Once per 111 years
Roseville to Benicia	72*	0.00946	Once per 105.7 years
A. Entering California on the UPRR-owned Roseville Subdivision near the southeast corner of Sierra County and passing through Nevada and Placer Counties to Roseville (a total of approximately 119 miles from the state line to Roseville); and Roseville to Benicia.	191	0.0251	Once per 39.8 years

B. Entering California on the UPRR-owned Winnemucca Subdivision near Herlong in Lassen County, switching to the UPRR-owned Canyon Subdivision in Plumas County, switching to the UPRR-owned Sacramento Subdivision near Oroville in Butte County, switching to the UPRR-owned Valley Subdivision near Marysville in Yuba County, arriving in Roseville in Placer County (a total of approximately of 229 miles from the state line to Roseville); and Roseville to Benicia.	301	0.0396	Once per 25.3 years
C. Entering California on the UPRR-owned Black Butte Subdivision near Dorris in Siskiyou County, switching to the UPRR-owned Valley Subdivision, entering Shasta, Tehama, Butte, Yuba, and Placer Counties to Roseville (a total of approximately 297 miles from the state line to Roseville); and Roseville to Benicia.	369	0.0485	Once per 20.6 years
D. Entering California on the UPRR-owned Yuma Subdivision near Winterhaven in Imperial County, passing through Riverside and San Bernardino Counties, switching to the UPRR-owned Mojave Subdivision near San Bernardino, entering Los Angeles and Kern Counties, switching to the UPRR-owned Fresno Subdivision near Bakersfield, passing through Tulare, Fresno, Madera, Merced, Stanislaus, San Joaquin, and Sacramento Counties before switching to the UPRR-owned Martinez Subdivision near Sacramento, and going through Yolo and Solano Counties to arrive at the Valero facility in Benicia (a total of approximately 705 miles from the state line to Benicia).	705	0.926	Once per 10.8 years
E. Entering California on the UPRR-owned Cima Subdivision near Nipton in San Bernardino County; switching to the BNSF-owned Needles, Cajon, and Mojave Subdivisions; switching to the UPRR-owned Mojave Subdivision in San Bernardino County; and switching to the UPRR-owned Fresno Subdivision in Kern County near Bakersfield. For the rest of the trip to Benicia, the same route used in Route D above would be used (a total of approximately 607 miles from the state line to Benicia).	607	0.0798	Once per 12.5 years
F. From the north, entering California on the BNSF-owned Gateway Subdivision near Stronghold in Modoc County, going through Lassen and Plumas Counties before switching to the UPRR-owned Canyon Subdivision near Keddie, traveling through	371	0.487	Once per 20.5 years

Butte County, and switching to the UPRR-owned Sacramento Subdivision near Oroville. After this, the same route described in the Route B alternate could be used (a total of approximately 371 miles from the state line to Benicia).			
G. From the south, entering California on the BNSF-owned Needles Subdivision near Needles in San Bernardino County, switching to the BNSF-owned Cajon Subdivision near Barstow, switching to the BNSF-owned Mojave Subdivision near Barstow, proceeding into Kern County, switching to the UPRR-owned Mojave Subdivision near Mojave, switching to the BNSF-owned Bakersfield Subdivision near Bakersfield, proceeding into Tulare, Kings and Fresno Counties, switching to the BNSF-owned Stockton Subdivision near Fresno, going through Madera, Merced, Stanislaus and San Joaquin Counties, switching to the UPRR-owned Fresno Subdivision near Stockton, going into Sacramento County, switching to the UPRR-owned Martinez Subdivision near Sacramento, and going through Yolo and Solano Counties to the Valero facility in Benicia (a total of approximately 656 miles from the state line to Benicia).	656	0.0862	Once per 11.6 years

* As stated in a previous note, Appendix F based its calculations on a distance of 69 miles between Roseville and Benicia. It is unclear how this figure was arrived at. In CPUC staff's calculation, the mileage from Roseville (milepost 106.4) to Benicia (milepost 34.5) is 72 miles. The 72 mile figure is used in the above calculations.