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Re: Review of Responses to Fox April 4, 2016 Comments on Valero's Appeal of Planning Commission's Denial of Valero Crude-by-Rail Project

Dear Ms. Koss:

As you requested, I have reviewed the letters by MRS[1] and ESA[2] that respond to my 4/4/16 Comments on Valero's Appeal of Planning Commission's Denial of the Valero Crude-by-Rail Project.[3] The MRS and ESA responses are notable for their lack of support for numerous assertions. With few exceptions, they present no supporting calculations nor citations to specific pages in the EIR, reports, or web links. Thus, they present no new evidence and fail to respond to my comments.

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[1] Letter from Steven R. Radis, MRS, to Amy Million, City of Benicia, Re: Response to Comments on Valero Crude-by-Rail Project, April 12, 2016 (4/12/16 Radis Letter); Available at: https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/8773/Attachment_3-_MRS_Response_Letter_to_Fox_Comments.pdf.

[2] Memorandum from Tim Rimpo, Janna Scott, and Cory Barringhaus, ESA, to Amy Million, City of Benicia, Re: Response to Comments of Phyllis Fox, April 11, 2016 (4/11/16 ESA Letter); Available at: https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/8773/Attachment_3-_MRS_Response_Letter_to_Fox_Comments.pdf.

[3] Phyllis Fox, Comments on Valero's Appeal of Planning Commission's Denial of Valero Crude-by-Rail Project, April 4, 2016 (4/4/16 Fox Letter), pdf 49-140 (w/out exhibits); Available at: http://www.ci.benicia.ca.us/vertical/sites/%7BF991A639-AAED-4E1A-9735-86EA195E2C8D%7D/uploads/Public_Comments_Submitted_April_4-5_2016.pdf.

I. ON-SITE HAZARDS (MRS)

A. Accidents At Crude Unloading Terminals

Mr. Radis uses incident information from the Pipeline and Hazardous Materials Safety Administration (PHMSA) to conclude that "accident history at rail crude oil unloading facilities is almost the polar opposite" of the scenarios that I described. He further asserts that accidents at crude oil unloading facilities are "quite rare."[4] The support for these claims is 2000 to 2015 PHMSA data for "rail crude oil unloading facilities." However, the supporting data or a specific citation where the data could be found are not provided. I was unable to confirm Mr. Radis' claim with publicly available data on the PHMSA website. Regardless, Mr. Radis' argument is misleading and incorrect as explained below.

1. Private Rail Terminals Are Exempt from PHSMA Reporting

Incidents need only be reported to PHMSA during "transportation" by a rail carrier.[5] Thus, incidents during unloading operations at a private (non-railroad) terminal, such as the Valero terminal, are not reported to PHSMA:

> *"Unloading operations. Incidents that occur or are discovered while a consignee is unloading a hazardous material from a transport vehicle or bulk packaging after the carrier has delivered the material are not required to be reported because these incidents occur after transportation has ended. Incidents that occur while the carrier that delivered the hazardous material is observing or participating in unloading operations must be reported because the carrier is deemed to be in possession of the hazardous material at that point; thus, these incidents occur during transportation. For these incidents, the carrier must complete the report."*[6]

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[4] 4/12/16 Radis Letter, pp. 1-3.

[5] See reporting requirements at 49 CFR 171.15, 49 CFR 171.16 and 49 CFR 225.09.

[6] PHSMA, Guide for Preparing Hazardous Materials Incidents Reports, January 2004, p. 1; Available at: http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_E48DC74FFC5E921568E9E899FA06C94EA17B4200/filename/reporting_instructions_rev.pdf.

Similar language is present in the PHSMA Guide for loading operations. Therefore, the data that Mr. Radis relied on to assert that accidents at crude oil unloading facilities are "quite rare" and that "accident history at rail crude oil unloading facilities is almost the polar opposite" of the scenarios that I described is based on a database that does not include any data from private rail unloading terminals such as the proposed Valero terminal. The majority of the crude-by-rail terminals are privately owned.

2. The PHSMA Incident Data Are Unreliable

The PHSMA website includes a data quality assessment report that confirms that PHMSA incident reports are very incomplete and miss most incidents, including those "outside transportation" (such as during loading and unloading), and that there are otherwise major problems with incident reports that PHMSA does receive:

> *"Missing data often compromises our ability to draw useful conclusions. A 2007 review estimated we are missing 60-90% of the hazmat incidents that occur.*
> *[…]*
> *Our "peripheral vision" is limited too: for several "invisible risks" (e.g., gas pipeline master meter operators or failures of DOT packages "outside transportation"), we have little/no risk data."*[7]

Elsewhere, this data quality report explains that:

> *"There are several "invisible risks" (within our statutory authority but not necessarily regulated) where we have little/no risk data – for example:*
>
> - *Bulk loading and unloading of rail tank cars"*[8]

And with respect to "hazmat bulk loading/unloading analysis" PHSMA explains:

- *"**We lack data on one of the central risks** – unloading of rail cars at fixed facilities – because our reporting requirements for hazmat incidents are limited to events that occur "in transportation." […]*

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[7] Rick Kowalewski, PHMSA, A Data Quality Assessment. Evaluating the Major Safety Data Programs for Pipeline and Hazardous Materials Safety, November 10, 2009, pp. 1-2. ; Available at: http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_BA1B26D970823D0EF3A2A5BE71A5E0DF4B691800/filename/DQA%20Report.pdf.

[8] Kowalewski, p. C-4.

- ***We have large uncertainty in our conclusions*** *because of substantial underreporting of hazmat incidents, and failure codes which cannot be used to nail down the transport phase during which a failure occurred. Some large effects were due to a small number of companies reporting, suggesting missing data."*[9]

Thus, it is not surprising that Mr. Radis concluded that accidents at crude oil unloading facilities are "quite rare" and don't include the types of accidents I indicated could occur. He relied on a data base that doesn't report accidents at the type of facility Valero proposes to build. There are many other problems with Mr. Radis' analysis, outlined below.

3. <u>The Scope of Review Is Misleading and Inadequate</u>

Mr. Radis relies on only the last 15 years of PHSMA data for crude oil rail unloading facilities to support his proclamations. This time period is far too short and the facility type far too narrow to estimate the probability and consequences of accidents over the lifetime of the proposed Valero terminal.

First, the proposed unloading terminal is unique due to its location adjacent to the refinery tank farm immediately west of the rail spur and unloading racks (West Tank Farm), Sulphur Springs Creek, and commercial properties along East Channel Road in the Benicia Industrial Park. The new rail spur and unloading rack are parallel to the existing Valero Refinery West Tank Farm, sandwiched between the West Tank Farm on the west and Sulphur Springs Creek on the east. The closest tank in the existing West Tank Farm is only 45 feet away from the arriving tracks and loading racks, separated from the tanks by only a 20-foot wide service road and the tank farm berm, which will be moved closer to the tanks to make room for the Project.[10]

Further, the rail-imported crude oil will be transported through a pipeline that runs through the West Tank Farm to the "Crude Tank Farm," located over 7,000 feet southwest of the unloading racks, adjacent to a residential neighborhood. Finally, the site is located in a "regulatory floodway" and in an area of high earthquake-induced shaking.

This juxtaposition of facilities, dangerous natural conditions, and nearby sensitive receptors renders the proposed site much more dangerous than typical

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[9] Kowalewski, p. D-4 (**emphasis** in original).

[10] See photographs 1-13 in Land Use Application.

terminals. The co-location of the West Tank Farm and unloading terminal coupled with these natural hazards significantly increases the probabilities, types, and magnitudes of accidents that can occur at the rail terminal due to chain reactions that involve multiple facilities.

The co-location of the West Tank Farm and unloading terminal is double jeopardy. An accident in the adjacent West Tank Farm, which includes LPG spheres, could trigger accidents at the unloading facility via vapor clouds that ignite at the unloading terminal, causing multiple unloading rail cars to discharge their contents. As a result, the 30,000 gallon capacity (one railcar of crude) of the underground containment sump would be exceeded and so would other safety features. Even if the capacity of the sump were not exceeded, a large spill of highly volatile Bakken crude on a hot summer day, triggered by a tank BLEVE, could form a vapor cloud at the terminal that could ignite, creating a fireball that would damage adjacent railcars and their transfer hoses. Alternatively, an accident at the terminal could engulf tanks in the West Tank Farm, triggering a much larger accident than caused by the terminal in isolation. Similar accidents have been reported elsewhere.[11]

Similarly, accidents at the Crude Tank Farm, where the rail-imported crude oil will be stored, could release vapors that would engulf adjacent tanks and nearby crude oil and LPG railcars, setting off chain reactions.[12] Alternatively, a major earthquake could disconnect the railcars from the loading rack or tip over numerous railcars, spilling their contents and releasing vapor clouds. Emergency response systems would likely be unavailable due to widespread power outages.

Thus, narrowly focusing only on crude oil unloading facilities (which are not even included in the PHSMA database) as in Mr. Radis' 4/12/16 Letter misleads as to the probability and consequences of accidents. Tank accidents, including for LPG spheres in the West Tank Farm, as well as conventional unloading accidents and

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[11] See, *e.g.,* Lees, Table A1.5, #468: PEMEX LPG Terminal, Mexico City; (An 8-inch pipe between a sphere and a series of cylinders ruptured. LPG was released for about 5-10 minutes, forming a vapor cloud that drifted to a flare stack. It ignited, causing a violent ground shock. A number of ground fires occurred. About 15 minutes after the initial release the first BLEVE occurred. For the next hour and a half there followed a series of BLEVEs as the LPG vessels violently exploded. 500 individuals were killed and the terminal was destroyed.) See: http://www.hse.gov.uk/comah/sragtech/casepemex84.htm.

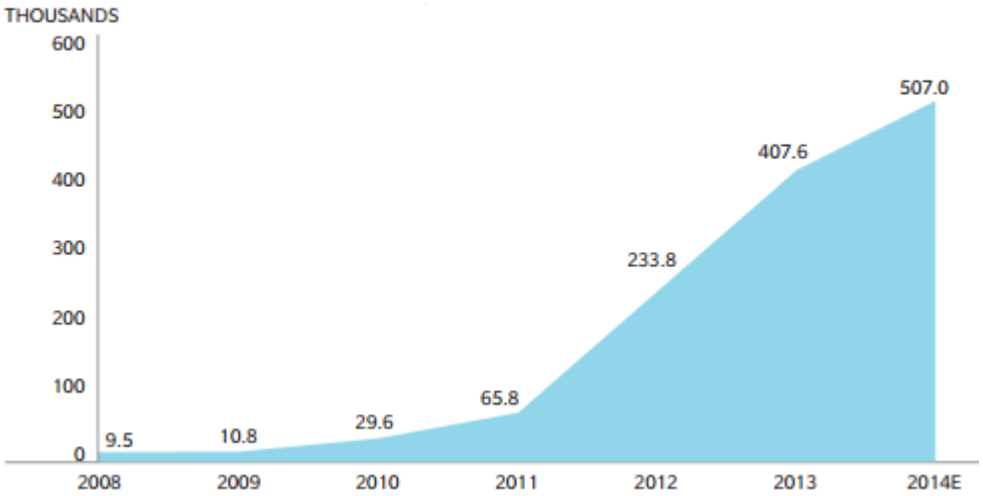
[12] See, *e.g.*, Lees, Table A1.5, #305: Philadelphia Crude Oil Tank Farm. (Hydrocarbon vapors released during loading of overfilling of crude oil into an internal floating roof tank ignited outside of the tank and followed the vapor back into tank, causing fire at the tank's vents and explosions, which spread to adjacent tanks and other nearby equipment. There were 8 deaths and 2 injuries.)

supporting arrival and departure railspurs, should have been considered in determining accident probabilities and consequences.

Second, a very long and broad record is required to establish worst-case accident scenarios and probabilities for the lifetime of the facility. Sizeable crude oil transport in 50 to 100 car unit trains is a new phenomenon. Historically, crude oil has been transported by pipeline, ship, and tanker truck. Historically, crude oil transported by train was uncommon and generally only in "manifest" or "mixed" trains carrying crude oil interspersed with other commodities in box cars, hoppers, etc. Thus, relevant accident data for unloading two 50-car unit trains of crude oil every day is very scarce, far too scarce to determine accident probabilities and consequences over the lifetime of the proposed Valero facility by considering only crude oil unloading terminal incidents in database that does not report incidents from these terminals.

Third, sizeable shipments of crude oil in unit trains started only around 2011, in response to new shale crude discoveries in the midcontinent that were not connected to market by pipeline. This is demonstrated by Figure 1, which shows a dramatic rise in crude oil shipped by rail, starting around 2011. Mr. Radis relies on statistics for the 15 year period 2000 to 2015, which misleads because only 4 years out of this 15-year record included significant unit train crude transport and unloading. Four years of data is simply inadequate to determine accident probabilities for a terminal that will operate for at least 30 years.

Figure 1: Originated Class I Carloads of Crude Oil, 2008-2014.[13]



Fourth, Mr. Radis restricted the population considered to just "rail crude oil unloading facilities." This is far too narrow to estimate the range of likely potential spill volumes and accident types at rail terminals because, as demonstrated in Figure 1, shipping crude by rail to unloading facilities is very new, starting only around 2011. Further, there are very few dedicated unit-train crude oil terminals with long-term operating histories from which to draw accident conclusions.[14] Most are new and thus would not experience the types of accidents that might occur as the proposed facility ages. Finally, restricting the population to crude oil rail terminals ignores the rail spur, adjacent tanks farm, crude oil storage facilities, connecting pipeline and other infrastructure.

It is standard procedure to extrapolate from similar facilities when there is inadequate data to establish accident probabilities for a narrowly defined, specific type of facility, as here. Thus, accident statistics for all terminal operations, including loading and unloading all flammable liquid products, as well as tank farms and pipelines, should have been considered for a substantially longer period of record. Lees' seminal *Loss Prevention in the Process Industries* includes a summary of case

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[13] Oliver Wyman, Ten Questions on Crude-by-Rail Risks, 2015; Available at: http://www.oliverwyman.com/content/dam/oliver-wyman/global/en/2015/feb/ten-questions-on-crude-by-rail-risks.pdf. See also: Annual Rail Traffic Data; Available at: https://www.aar.org/pages/freight-rail-traffic-data.aspx.

[14] Crude-by-Rail Facilities Map; Available at: https://www.bnsf.com/customers/oil-gas/interactive-map/pdfs/BNSF-OG-Overview-Map.pdf. See also: tp://priceofoil.org/rail-map/.

histories of "some major accidents in the process industries."[15] This summary identifies many examples of "major" accidents at loading terminals and adjacent facilities, comparable to those that I identified as possible at the Project site in my comments. Other major accidents at unloading terminals are documented on the National Transportation Safety Board website.[16]

B. The EIR's Quantitative Risk Assessment for On-Site Hazard Impacts Is Incomplete and Not Supported

My 4/4/16 comment letter addressed only on-site impacts. The MRS response concatenates the on-site and off-site QRA. The off-site QRA is generally much better supported in the record than the on-site QRA, which is unsupported.

The MRS letter includes numerous general assertions as to methodologies, scenarios, and assumptions that were evaluated in the EIR. However, none of these assertions are supported with citations to page numbers in the EIR or elsewhere in the record where the information can be found. Further, these assertions are "generalized" and not project- or site-specific and thus cannot be used to support the EIR's on-site hazard analysis and the risk profiles used to determine significance. Some examples, presented as the page number from the 4/12/16 Radis letter, followed by my summary response in **bold**, include the following:

- Radis, p. 2: The QRA followed recommended PHMSA and other methodologies. **The on-site QRA was performed with models that the QRA claims are confidential. None of the supporting calculations and specific methodologies are disclosed in the record.**

- Radis, p. 4: "The QRA considered the adverse consequences of a derailment and tank car failure, but given the low probability of this scenario, it was not a significant contributor to societal risk." **The EIR does not include any support for societal risk from on-site accidents for any accident scenario, including derailment and tank car failure.[17]**

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[15] Dr Sam Mannan, Lees' Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control, Fourth Edition, 2012, Appendix 1, Table A1.5.

[16] See, *e.g.*, NTSB, Hazardous Materials Release from Railroad Tank Car with Subsequent Fire at Riverview, Michigan, July 14, 2001; Available at: https://app.ntsb.gov/doclib/reports/2002/HZM0201.pdf.

[17] The referenced "societal risk" is the unsupported "risk profiles" in RDEIR Figure 5-3. The EIR contains no support for these risk profiles, as explained in my 4/4/16 comments, Comment IV.A.3 and IV.B. The

- Radis, p. 5: "…the QRA did include the risk of spills into the berm area surrounding the tanks, as well as the thermal radiation hazards that could result from a pool fire at the tank farm." **As discussed below, the EIR does not include any analysis of the risk of spills in the berms surrounding the tanks where the rail-imported crude oil would be stored.**

- Radis, p. 5/6: Ignition sources are generally discussed in response to my comment that they are not disclosed. **The EIR does not identify the specific ignition sources and probabilities used to calculate the accident frequencies used in the risk profiles in RDEIR Figure 5-3. The general discussion does not fill this gap.**

The EIR determined the significance of accidents using "risk profiles". These risk profiles plot the frequency of the worst-case accident on the y-axis versus the number of injuries and fatalities on the x-axis.[18] These risk profiles are unsupported in the record. They simply appear. The EIR, the responses to Public Record Act (PRA) requests, and the responses to comments do not disclose how the accident frequencies on the y-axes of the risk profiles or the number of injuries and fatalities on the x-axes were determined. In other words, the on-site QRA's significance determination is unsupported.

My review of the EIR, PRA responses, and other materials indicates that most assertions in response to my 4/4/16 comments are unsupported and/or demonstrably and factually incorrect. The key step in the accident analyses -- assigning significance based on risk profiles -- is missing from the record. The public shouldn't have to piece together the hazard analysis from obscure clues spread throughout the record and guess what the missing parts might be. The EIR should clearly disclose all assumptions and present all calculations that support the risk profiles in one coherent place. It does not. The EIR fails as an informational document.

4/12/16 Radis letter does not addresses my comments, but rather asserts the analysis is there, without citing it. The analysis is missing from the EIR.

[18] RDEIR, Figure 5-3.

C. Tank Accidents Were Not Evaluated

I commented that accidents at the tanks that would store rail-imported crude were not included in the QRA.[19] This is a significant omission because the tank farm that will store the rail-imported crude is very close to a residential neighborhood[20] and the Robert Semple Elementary School,[21] which are in the "blast zone."

First, Mr. Radis asserts that the tanks that would store rail-imported crude oil are "existing" and thus "are considered as part of the CEQA baseline and are already in crude oil service."[22] This is wrong. Existing permit limits do not establish the CEQA baseline, but rather actual conditions. As explained in my previous comments, in the baseline, these tanks stored heavy low vapor pressure crudes, which would be much less likely to ignite and cause an accident than the highly volatile rail-imported crudes, which have much higher vapor pressures.[23] The EIR must evaluate the increase in probability and consequences of an accident at these tanks relative to the baseline crudes. The EIR and the various responses to comments and PRA requests do not include any accident analyses for these tanks (Tanks 1701-1708).

Second, Mr. Radis asserts that "the QRA did include the risk of spills into the berm area surrounding the tanks", without specifying which tanks (there are many adjacent to the proposed terminal) …"as well as the thermal radiation hazards that could result from a pool fire at the tank farm."[24] However, he fails to point to a specific page of the EIR where these analyses may be found. My search of the EIR fails to identify any analysis of spills into the tank berm area or pool fires at the tank farm where the rail-imported crude oil would be stored.

Rather, the 4/12/16 Radis letter includes Figure 1, presumably to support this claim. This figure was also provided in response to SAFER California's March 10, 2016 PRA request. It shows the "blast zone" for the same accident, presented as a series of concentric circles centered around six different accident locations, including four within the tank farm immediately west of the Project site (Figure 1b).

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[19] 4/4/16 Fox Comments, pp. 57-61.

[20] 4/4/16 Fox Comments, p. 27 and Figure 5.

[21] 4/4/16 Fox Comments, pp. 28-29 and Figure 6.

[22] 4/12/16 Radis Letter, p. 5.

[23] 4/4/16 Fox Comments, Table 1.

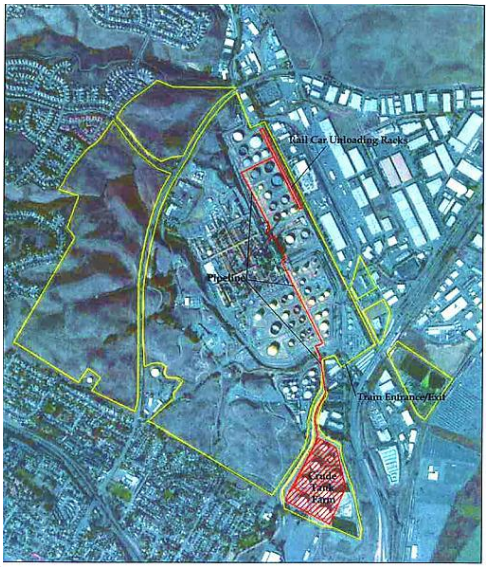
[24] 4/12/16 Radis Letter, p. 5.

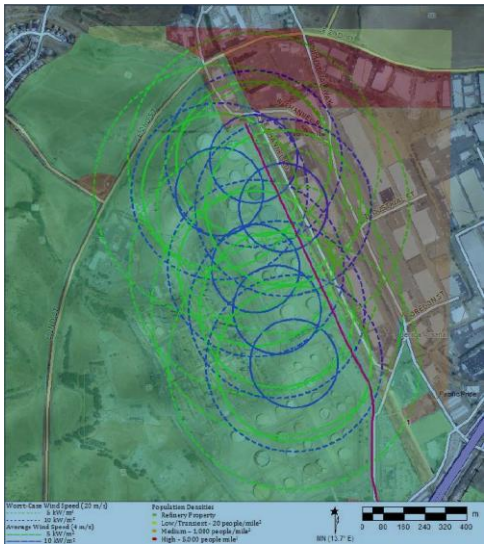
However, none of these four tank locations are near those where the rail-imported crude oil would be stored (Tanks 1701-1708). The tanks that would store rail-imported crude (1701-1708) are southwest of the area shown on Radis Figure 1, reproduced below as Figure 2b. This unanalyzed release point is the closest to residential and other sensitive receptors, as shown in Figure 1 of my 4/4/16 comments, reproduced below as Figure 2a. The tank farm that would actually store the rail-imported crude oil was not analyzed in the EIR or in subsequently submitted responses to PRA requests. If it had been, off-site impacts would have been significant due to the proximity of sensitive receptors and the higher population density of residential areas.

Mr. Radis' Figure 1 simply moves the worst-case, on-site accident to different locations, without considering the changing conditions at those locations that would affect accident consequences. For example, an accident at a tank in the West Tank Farm could engulf several adjacent tanks, including LPG spheres, resulting in much greater consequences than the spill of 240,000 gallons of crude oil in the middle of the unloading rack. Thus, moving the worst-case rail spur accident centroid around in the West Tank Farm without performing a site-specific QRA for the specific impacted tanks is not relevant and does not constitute a tank accident analysis.

Figure 2: Comparison of Tank Release Points Modeled in Radis Figure 1 with Tanks that Would Store Rail-Imported Crude Oil (red crosshatched area Fig. 2a).

(2a) 4/4/16 Fox Comments, Figure 1 *(2b) 4/14/15 Radis Figure*





Finally, it is important to note that Radis Figure 1 (Fig. 2b above) was not included in the EIR and was submitted in response to a PRA request addressed in the

3/30/16 Radis letter.[25] The record contains no support for this figure nor discussion of its implications. My inspection of this figure indicates that it just moves the hazard zones for the same worst-case accident around the site and West Tank Farm, in an effort to support the selected location for the worst-case accident. However, the figure fails to include the true worst-case location, the actual tank farm where the crude oil would be stored, the red cross-hatched area in Figure 2a, located only 1,000 feet from a residential neighborhood. Further, if the worst case on-site accident occurred in the West Tank Farm, it could have much more severe consequences than the assumed on-site worst-case accident, located in the middle of the unloading rack, due to proximity of adjacent tanks.

D. Safety Features Will Not Prevent Accidents

The 4/12/16 Radis Letter relies on unloading rack safety features to mitigate impacts of accidents.[26] However, these safety features only mitigate spills within the unloading rack area that are less than 30,000 gallons (about one railcar).[27] Spills at the tank farm and along the rail line outside of the unloading racks would not be controlled by these safety features. Further, spilled Bakken and other highly volatile crudes could form a vapor cloud before the spilled crude reaches the sump, which could ignite before built-in safety features shutdown. Finally, during a natural disaster, such as an earthquake, power outages would likely occur, resulting in the failure of electrically activated safety features, such as the SCADA system.

E. The Worst-Case Accident Location Was Not Selected

The EIR assumes the worst-case accident would occur in the southern one third of the loading rack. However, I commented that if the accident occurred elsewhere, such as at the northern end of the loading rack or in the Crude Tank Farm where rail-imported crude will be stored, consequences would be greater due to proximity of residential areas. I further noted the EIR includes no justification for selecting the center

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[25] Letter from Steven R. Radis, MRS, to Amy Million, Benicia, Re: Public Records Act Request for the Valero Crude by Rail Project, March 30, 2016 (3/30/16 Radis Letter).

[26] 4/12/16 Radis Letter, pp. 4 ("The unloading facility is designed to drain any spilled oil away from the rail cars and to minimize the potential for flammable vapors to be released…"), 5 ("..safety features that are part of the proposed project to minimize the hazards associated with the unloading facility and adjacent refinery tanks and equipment.").

[27] RDEIR, pdf 327.

of the loading rack as the location for the worst-case accident.[28] Figure 2b above is not justification because it fails to consider site-specific conditions at each location.

The Radis response characterizes my comment as "disingenuous" because I had access to his map showing different release points. My comments acknowledge this map and include it as Figure 29. However, this map does not address my comments, which relate to the fact that the EIR and this map do not include two additional accident sites that I pointed to in my comments: (1) the northern end of the loading rack and (2) the West Tank Farm. The Radis response ignores the West Tank Farm where rail-imported crude oil would be stored, which is the worst case location for the selected accident scenario.

The Radis response also argues that an accident at the northern end of the loading rack would be precluded by facility design.[29] However, this is clearly wrong. *First*, the worst-case accident involves a spill of 240,000 gallons (8 rail cars).[30] The containment sump at the unloading rack is designed to contain only 30,000 gallons. *Second*, the EIR concluded the location of the worst-case accident was in the middle of the loading rack, which would include the same facility design. Thus, if facility design does not control an accident in the middle of the loading rack (the EIR case), an accident a little further north, but still within the loading rack, also would not be controlled.

In other words, Mr. Radis has contradicted himself. He first asserts the worst-case accident would occur in the middle of the loading rack, where he does not claim the facility design mitigates the impact. He then asserts, when I propose a location at the northern end of the same loading rack, that facility design would mitigate the significant impacts of the very same worst-case scenario. He can't have it both ways.

F. Mitigation for Other Rail Traffic at the Site Is Not Enforceable

Mr. Radis asserts that there is no potential for interaction of Project trains and facilities with the LPG and coke rail cars because "there would be no simultaneous use of the tracks."[31] However, this does not preclude the presence of parked railcars of LPG awaiting shipment that could be involved in accidents involving chain reactions. Further, the EIR does not include restrictions on simultaneous use of the tracks as a mitigation measure. The EIR must be revised to include "no simultaneous use of tracks

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[28] 4/4/16 Fox Comments, Comment IV.F.4, p. 74.

[29] 4/12/16 Radis Letter, p. 6.

[30] RDEIR, p. 2-94.

[31] 4/12/16 Radis Letter, p. 7.

by other commodities", or the hazard analysis must be revised to consider the interactions.

II. ON-SITE ROG EMISSIONS (ESA)

The EIR failed to evaluate two major on-site sources of ROG emissions: (1) railcar fugitive emissions and (2) tank emissions. The responses to my 4/12/16 comments do not address the deficiencies.

A. On-Site Fugitive ROG Emissions from Railcars Are Significant

The ESA letter asserts that "[t]he Revised DEIR and FEIR include emission estimates for rail car tanker fugitive ROG emissions (see Revised DEIR Appendix A)."[32] The RDEIR contains an unsupported and erroneous estimate of railcar fugitive emissions from seven uprail air districts. The BAAQMD and the proposed Valero Terminal are excluded.[33] I estimated on-site ROG emissions from railcars. The EIR does not include any estimate for these emissions.

B. Crude Oil Storage Tanks ROG Emission Are Significant

The ESA letter asserts that as the Project does not include any changes to the Refinery's existing permits, there would not be any increase in tank ROG emissions.[34] This is wrong.

First, the baseline for determining an increase in emission under CEQA is the actual emissions at the time environmental review begins, not permit limits.

Second, the subject permit does not contain any ROG emission limits or vapor pressure limits, which could be used to estimate ROG emissions. While BAAQMD Regulation 8, Rule 5 prohibits storing crudes with a true vapor pressure (TVP) equal to or greater than 11 psia in external floating roof tanks, without certain modifications, the EIR discloses that the subject crudes could have TVPs ranging up to 13 psia.[35] Further, no monitoring for ROG or vapor pressure is required in the subject permits. Thus, even the upper limit of 11 psia for an unmodified tank is unenforceable as a practical matter.

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[32] 4/12/16 ESA Letter, p. 1.

[33] RDEIR, pp. A-3 to A-14.

[34] 4/11/16 ESA Letter, pp. 1-2.

[35] 4/11/16 Fox Comments, pp. 19-20.

C. On-Site TAC Emissions from Railcars Result In Significant Health Impacts

The ESA letter asserts that I used "different estimates of ROG evaporative emissions from storage tanks and railcar unloading than those documented and analyzed in the EIR" to assert significant health impacts from benzene.[36] This is incorrect.

I did not estimate benzene emissions from storage tanks and railcar unloading. Rather, I estimated benzene emissions from railcar fugitive emissions, an entirely separate source. The EIR does not include any estimate of benzene emissions from railcar fugitive emissions or tanks. Thus, there is no methodological issue. The EIR failed to evaluate benzene emissions from on-site railcar fugitive emissions.

III. FLOODING IMPACTS (ESA)

My previous comments show that, based on substantial evidence (including calculations), flooding impacts are significant. The responses cite to various places in the DEIR, RDEIR, and FEIR where flooding impacts are discussed. I reviewed and considered these and other references to flooding in the EIR when drafting my 4/4/16 comments. However, as explained in my previous comments, these citations refer to unsupported assertions which lack supporting citations, analyses, and calculations. Unsupported assertions are not substantial evidence. The ESA response does not cure this defect by providing substantial evidence, but simply repeats the unsupported assertions in the EIR, except as discussed below.

A. The Project Could Increase Flooding

The EIR's qualitative and unsupported analysis of flooding focuses on "structures" (aboveground facilities associated with the loading terminal, e.g., the racks, pump, pipeline) within the flood zone and ignores the trains. See, for example, the first, second, and last complete paragraphs on page 3 of the 4/11/16 ESA Letter. See also the assertion: "The impact analysis is correctly focused on permanent structures that could redirect flows during a flood event."[37]

I demonstrated by calculation and other analysis that the presence of up to three 50-car unit trains on site would block the passage of flood flows, acting like a dam and occupying volume that flood flows would otherwise use to dissipate. I estimated total

[36] 4/11/16 ESA Letter, p. 2.
[37] 4/11/16 ESA Letter, p. 5.

on-site train weight would be at least 10,646 tons, so they would not wash away, but could tip over. I further estimated that these trains would displace 48% of the volume otherwise available for flood flows at the yard and 29% of the volume at the loading racks. This would cause an increase in elevation of floodwater upstream of the Project site and cause floodwaters to spread out to the east (as the West Tank Farm berm blocks the floodwaters on the west), penetrating further into the Benicia Industrial Park. Thus, the on-site trains themselves have the potential to aggravate flooding in nearby areas, which is a significant impact under CEQA that was not disclosed in the EIR.[38]

The ESA letter responds that flooding is not an issue because: (1) the rail cars would be evacuated before the floodwaters arrive; (2) the railcar wheels are 24 inches in diameter so, presumably, the water would flow under them; and (3) any flooding would be contained on the west side of Sulphur Springs Creek due to elevation differences. None of these assertions is supported with substantial evidence, and they are factually wrong.

1. <u>The Rail Cars Could Not Be Evacuated Fast Enough to Avoid Significant Impacts from Increased Flooding</u>

The response asserts that floods at the Project site would not tip over railcars as shown in my Figure 32 because "railcars could be moved off-site to higher ground and their arrivals and departures rescheduled to avoid and minimize flood related risks based on weather predictions."[39] It asserts that adequate advance warning would be available because "[s]evere flash flooding and related hurricane precursors that resulted in the Texas derailment […] are decidedly unanticipated in the Project area […] No evidence has been presented suggesting that flood waters would rise so quickly in the area as to preclude a responsible response to potential risk including removing trains from harm's way."[40]

(a) Advance Flood Warning May Not Occur

There are local situations in which floodwaters would rise before the trains could be evacuated, resulting in tipped-over railcars. If the tipped-over railcars occurred during a flooding event, flooding would be aggravated, resulting in a significant impact not disclosed in the EIR. If the tipped-over railcars occurred during a flooding event, such as an earthquake, released crude oil could result in a vapor cloud explosion or

[38] 4/4/16 Fox Comments, pp. 79-85.

[39] 4/11/16 ESA Letter, p. 5.

[40] 4/11/16 ESA Letter, p. 5.

BLEVE, leading to much more severe accidents than disclosed in the EIR as well as complicating any effort to move railcars offsite.

First, Lake Herman, which is upstream of the Project site on Sulphur Springs Creek, is in the "High" flood hazard category.[41] This means it is a dam where failure or misoperation will probably cause loss of human life.[42] The dam could fail unexpectedly from natural causes, such as an earthquake or from structural failure . While the probability for these events may be low, they are not zero. In these situations, there would no advance warning and thus no time to remove the railcars from the site. Further, emergency warning systems may not be operating due to local power outages.

Second, the type of weather events that knocked over the Texas railcars and which have also occurred in Benicia[43] and may occur more frequently at the Project site in the future, have not been typical of either location historically[44]. Storm events have been changing due to global climate change. In general, more severe weather is forecast for the future. Thus, the EIR must consider that flash floods, with little advance warning, could occur over the lifetime of the Project, aggravating flooding at adjacent properties.

(b) Evacuation to Higher Ground May Not Be Feasible

The EIR did not identify the location of higher ground, identify the route(s) to higher ground, or explain how long it would take to move the railcars to higher ground. All of this information should be identified in an emergency evacuation plan that should be required as flood mitigation.

First, railcars could not be instantly removed from the site in the event of a flood emergency, such as earthquake-induced or other failure of the 100-year old Herman dam. There could be up to three 50-car unit trains on site at the time of the flood warning. The railcars at the loading rack would have to be disconnected from the rack, assembled into a unit train(s), and moved offsite at 3 mi/hr with on-site staff for normal

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[41] Solano County Emergency Operations Plan, Flood and Tsunami Annex, March 2012; Available at: https://www.solanocounty.com/civicax/filebank/blobdload.aspx?BlobID=13276.

[42] National Inventory of Dams Data Status; April 20, 2003; Available at: https://cryptome.org/eyeball/sfb/sfb-eyeball.htm.

[43] JB Davis, City Opens Emergency Operations Center to Coordinate Efforts to Combat Flooding, Benicia, CA, December 2, 2012; Available at: http://patch.com/california/benicia/watch-rain-water-overflow-at-east-n-and-east-second-street.

[44] Al Gore, The Case for Optimism on Climate Change, February 2015, TDE2016; Available at: http://www.ted.com/talks/al_gore_the_case_for_optimism_on_climate_change#t-137484.

operations. Empty rail cars on the siding also would have to be assembled into a unit train(s) with available staff and moved off site. This would take at least 4 hours, perhaps longer, as it would occur under emergency conditions.[45] Further, advance warning of floods is frequently as short as 2 hours, particularly for the cloudburst type of storm typical of the area.[46] Thus, it is plausible that flood waters could reach the site before trains could be moved to higher ground.

Second, the EIR failed to identify the routes that would be taken to avoid floodwaters and where the higher ground is located. The ESA letter mentions that about 500 linear feet southwest of Bayshore Road is in an area of minimal flooding or Zone X.[47] However, 500 linear feet is not adequate to store three 50-car unit trains, which would be about 5,000 feet long.[48]

Third, in the event of a flood emergency, other local rail unloading/loading facilities in the floodplain, *e.g.*, auto staging area in the Benicia Railyard, straddling the lower end of Sulphur Springs Creek, would also have to evacuate. This would create congestion and delay.

Fourth, available local tracks that could be used to reach higher ground may also be flooded, preventing escape. The southern track of the UP Mainline runs parallel with and close to the Bay shore. This southern track is used to access the refinery. East of Sulphur Springs Creek, the southern track of the UP Mainline is very low lying, at an elevation of only 1 ft crossing Lake Herman Road. East of Lake Herman Road, the northern and southern tracks of the UP Mainline converge and traverse Suisun marshland. The rail line in this area is already subject to unstable ground and flooding. The unstable ground can cause "dips" in the track, at which trains must slow down.[49]

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[45] 4/4/16 Fox Comments, p. 4; Santa Maria FEIR, Table 2.5.

[46] Solano County Emergency Operations Plan, Flood and Tsunami Annex, March 2012; Available at: https://www.solanocounty.com/civicax/filebank/blobdload.aspx?BlobID=13276.

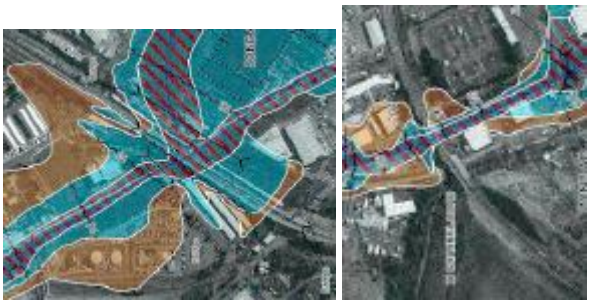
[47] 4/11/16 ESA Letter, p. 3.

[48] RDEIR, p. 2-28 (two train lengths are about 3,300 feet).

[49] Solano Rail Facilities Plan Update, July 8, 2015, p. 53 ("The lower track location at Lake Herman Road is at 1ft elevation and likely impacted by future sea level rise (see section 3.3). This was not a major consideration or concern at the time of the previous rail facilities plan 20 years ago, but is a significant issue now and in the future."), p. 96 ("One key area for delays is in the Suisun Marsh between Cordelia Road and Benicia. This area is subject to unstable ground and flooding. The unstable ground can cause "dips" in the track, at which trains must slow down, while flooding presents obvious obstacles to train movements, as well as expensive repairs. Potential improvements in this area include subgrade/ground improvements to reduce raising the track above the level of flooding."), p. 97 (The rail tracks crossing Suisun Marsh wetlands area are likely to be impacted by sea level rise. Soil subsidence in the wetlands is an additional concern and is the cause for much of the current UPRR railroad track maintenance in the

The excerpts from FEMA Panel 634 in Figure 2 show that rail lines leading into and out of the Project site would also likely be flooded.

Figure 2. Excerpts of FEMA Panel 634, 1/12/2015.



Fifth, if the trains were evacuated under emergency flooding conditions, this could put motorists stranded at railway crossings or workers trapped in buildings, such as the Ironworkers Union Local 378 on Bayshore Road, while the trains passed, at significant risk of death or injury from rising floodwaters. The EIR did not consider these significant secondary impacts of evacuating the trains.

2. Railcar Wheel Diameter Will Not Prevent Increased Flooding

The ESA flooding response relies on an email from the City's Public Works Director to conclude flooding impacts are not significant: "The FEMA Flood Insurance Rate Map Panel 634 shows the area of Industrial Way Between Bayshore Road east of Sulphur Spring Creek and West Channel Road as 'one AO (Depth 2).' I assume that the [crude by rail] tankers will park in this area parallel to Industrial Way. Since the rail car wheels are probably 24 inches in diameter, I do not see much risk."[50] Thus, the EIR assumed flood flows would pass under the railcars, which would not result in increased flooding in surrounding areas.[51]

First, what does "not..much risk" mean? If it means some risk, then the EIR must evaluate it.

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wetland area to maintain a level surface for the tracks. Inundation of the tracks is likely to occur with sea level rise, and temporary flooding of the tracks may occur with a storm tide."); Available at: http://www.sta.ca.gov/docManager/1000005509/Solano%20Rail%20Facilities%20Plan%20Update.pdf.

[50] 4/11/16 ESA Letter, p. 3.

[51] 4/11/16 ESA Letter, p. 5 ("Nonetheless, even if rail cars were located on-site during a flood event, they would not substantially impeded flows as water could travel underneath and between cars, ,i.e., the rail cars would not act like an impenetrable dam or wall to flood flows in any way similar to the photographs shown.").

Second, this is true only if the flood elevation is less than 24 inches. However, the West Tank Farm berm is 8 feet tall. The design basis is unknown, but is likely the hundred year flood elevation, to protect the tanks from flooding. Thus, while flood flows under 24 inches could theoretically pass mostly unimpeded[52] beneath the railcars, much deeper flood flows would not. They would be blocked by the railcars. Thus, the railcars would block flood flows as I estimated in my comments,[53] which properly excluded the distance between the tank car and the ground. The volume occupied by the railcars would increase flooding elsewhere, including in the Benicia Industrial Park. This is a significant impact that must be mitigated.

Third, as flood waters rise, the force of the water against the railcars would tip them over, as shown in Figure 32 of my 4/4/16 comments. The tipped-over railcar would continue to displace the entire volume of the unit trains. This would increase flooding elsewhere, including in the Benicia Industrial Park.

3. Flooding Would Not Be Contained on the East Side of Sulphur Springs Creek

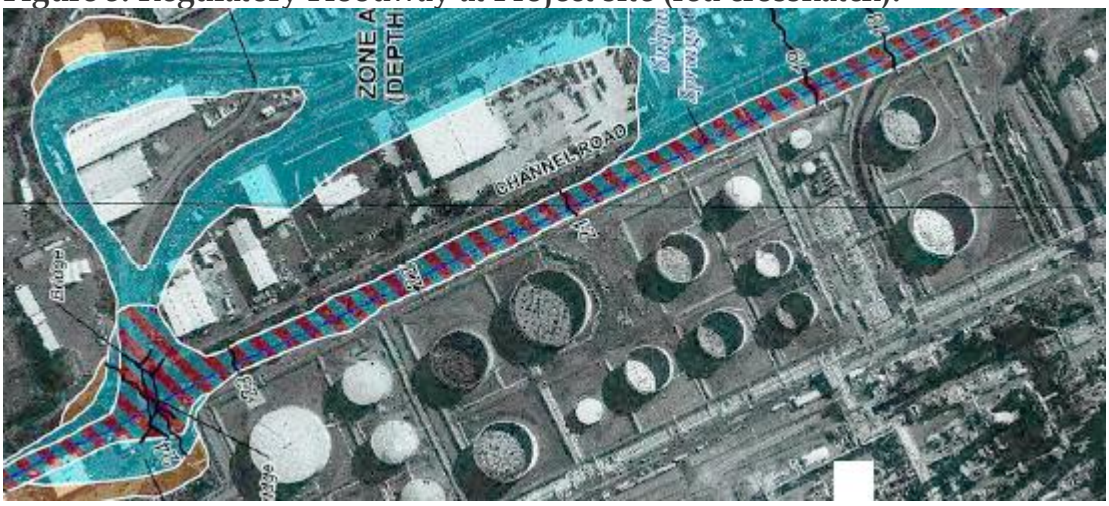
The 4/11/16 ESA letter asserts, again based on an email from the City's Public Director, that the Project site is at a higher elevation than East Channel Road by up to 10 feet, so any flooding would be contained on the west side of Sulphur Springs Creek.[54] A topographical map was not produced to confirm this conclusion. Moreover, it is inconsistent with the FEMA Flood Insurance Rate Map, which shows the regulatory floodway extends to the West Tank Farm berm along most of the Project site, except at the northern and southern ends. See Figure 3.

[52] Accumulated debris that would accumulate around the wheels and protrusions would block some of the flow.

[53] 4/4/16 Fox Comments, Comment V.B. See volume calculation in footnote 274, which is based only on the volume of the railcar and does not include the 24 inches between the rail and the bottom of the tank.

[54] 4/11/16 ESA Letter, pp. 3-4.

Figure 3. Regulatory Floodway at Project site (red crosshatch).



This is also inconsistent with the statement elsewhere on p. 4 of the ESA Letter that "…the unloading rack area would be located within a 100-year flood zone is acknowledged and evaluated [in the EIR]."[55] If the unloading rack is within the 100-year floodplain, as shown in Figure 3, flooding is not contained on the west side of Sulphur Springs Creek, but rather rises above the elevation of the Project site. The height of the West Tank Farm berm, 8 feet, suggests a significant rise.

The excerpt from the email fails to disclose floodwater depth along the Project site, which would have been much more useful than land surface elevations. Figure 3.

4. Mitigation Is Not Required

The response first argues that "it is logical to assume that the delivery of crude oil trains to the Project site would be temporarily halted during a flood even to prevent damage to the rail cars."[56] However, rather than requiring this as mitigation, the response goes on to assert that the impact is not significant and no mitigation is required. It further asserts that "it is wholly appropriate to expect that professionals will exercise a reasonable duty of care in carrying out their official duties..."[57] Professional expectations are not valid CEQA mitigation because they are not enforceable. Further, professional judgement during emergencies can, and often are, compromised by the resulting chaos.

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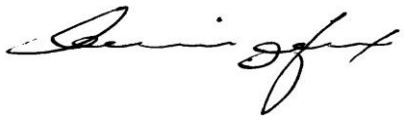
[55] 4/11/16 ESA Letter, p. 4.

[56] 4/11/16 ESA Letter, p. 5.

[57] 4/11/16 ESA Letter, p. 5.

The EIR fails to lay out a plan that would be followed for evacuating the site in an emergency. Relying on "professional judgement" in an emergency is a recipe for disaster. The EIR should require an evacuation plan and require that it be reviewed by on-site employees in annual training.

In sum, the MRS and ESA letters fail to address my 4/4/16 comments and present no new information or analyses. The Project as proposed in the EIR will result in significant on-site air quality impacts from railcar and storage tank ROG emissions; significant chronic and acute health impacts due to benzene present in on-site railcar ROG fugitive emissions; significant off-site impacts (death and injuries) from on-site accidents; and significant off-site flooding impacts from on-site railcars that would occupy floodplain volume.



Phyllis Fox