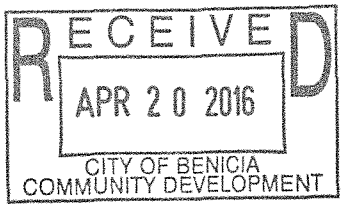
Valero Crude by Rail Project
Public Comments received
April 19-20, 2016

Commenter	Date Received
Agencies	
Scott Lichtig, California Attorney General Kamala Harris Office	20-Apr-16
Organizations	
Benicians for a Safe and Healthy Community	19-Apr-16
Safe Fuel and Energy Resources	20-Apr-16
Councilmembers	
Mayor Elizabeth Patterson	19-Apr-16
Applicant	
Diane Sinclair	19-Apr-16
Individual Comments	
Ed Ruszel	19-Apr-16
Judith Sullivan	19-Apr-16
Barabara Ramano / Nancy Lund	19-Apr-16
Ethan Buckner	20-Apr-16
Charles Davidson	20-Apr-16

Amy Million

From: Scott Lichtig <Scott.Lichtig@doj.ca.gov>
Sent: Tuesday, April 19, 2016 7:07 PM
To: Elizabeth Patterson
Cc: Amy Million
Subject: Valero Benicia Crude-by-Rail Project



Mayor Patterson-

The Attorney General's Office has reviewed Bradley Hogin's letter dated April 28, 2016, and the cases cited therein. After careful consideration, our Office's opinion regarding the scope of federal preemption as applied to this Project remains unchanged.

Sincerely,

Scott J. Lichtig
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California Department of Justice
1300 I Street, 15th Floor | Sacramento, CA 95814
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City Council Hearing, April 4, 2016

Valero Appeal of the Planning Commission denial of FEIR Certification and denial of the Crude By Rail Project permit; Valero Request for Delay in Appeal Process; Council Consideration of adequacy of the FEIR and Permitting of the CBR Project

Good evening, Mayor Patterson and Councilmembers,

This City is now at a crucial juncture in the CEQA process as it relates to Valero's request for Permit and the adequacy of the CEQA document — *the* critical juncture in the decision process, to allow or not allow the permit for the Crude By Rail Project. Benicia is currently in a position to make final determinations, and the State of California as well as many municipalities across California and the nation are watching closely. Benicia's decisions and the reasoned support for those decisions will be critically examined. I believe Benicia, and this Council in particular, has the means, motivation, and ethical wherewithal to deliver a reasoned and supportable decision – no matter how difficult and complex the issues.

First, you must deny Valero's request for a delay of the appeal process. Input from the Surface Transportation Board (STB) would merely represent another written "opinion" on the EIR. The STB is not the arbiter of the preemption issue – this responsibility lies with the judiciary. As such, the opinion provided would be of no value. If Valero wanted the STB's opinion to be entered into the record, Valero should have solicited and obtained that opinion well before the close of the comment period on the FEIR. The public (inclusive of all agencies) responded to the CEQA documents on time – at a significant cost of time and money. Approving this delay would serve Valero only. An exception made for the STB is inappropriate and would create a special class of CEQA responder – one with special privileges in the process. Further, there is no guarantee that STB would provide a response, let alone, provide one within any certain timeframe. Will the response be in six months, twelve months?

Throughout the CEQA process, Valero has complained about the length of time to resolution. Now, Valero, through this request would create an indefinite delay.

WHY?

One significant impact of delay would be that new information provided "de novo" would require a newly revised draft EIR be prepared and circulated for review and public comment. This equates to significant additional Staff time and effort.

Why move future hearings beyond the election season — perhaps to keep the issue out of public debate? Does the Applicant believe that an additional delay will quell the public's momentum and interest in the outcome, given the overwhelming critical and valid public response?

Our Planning Commission made no snap decision. Commissioners finally deliberated after three years of studying the Draft EIR, the Revised DEIR and the Final EIR, listening to the public and reading volumes of written comments. Their unanimous vote signals hundreds of hours committed to understanding the Project and its impacts as they were described and analyzed – or not – in those documents and as discussed by the public.

In their final deliberations, our Commission upheld CEQA and its legal requirements and rightfully determined that the CEQA document was not certifiable. The Commission additionally voted to decline approving the Project Permit and thereby stood firmly, *and ethically*, voting to protect public health, safety and the environment for sake of our own community's protections, but also, with respect for lives and locales near and far beyond Benicia. They recognized that the risks and impacts posed by this Project overall, would exist *in perpetuity.*

We expect that each of you has read, reviewed and analyzed the DEIR, the REIR, the FEIR as well as the vast amount of public testimony submitted on the failure of those documents to meet minimum CEQA requirements. The comments of local and regional residents, elected officials, public agencies, refinery experts, environmental organizations and our California Attorney General were ignored, dismissed, and avoided or refuted with repeated false, unsupported arguments and suspect analyses. Comments made to the DEIR remained unaddressed and uncorrected in the subsequent revisions and the final Response to Comments. The City has received volumes of commentary in opposition to the FEIR's certification

from multiple parties and such comments contained shared criticisms even though they were independently derived.

Valero and UPPR's opinions on preemption and trade secret law are flawed, extreme in their breadth and scope of interpretation and represent a significant threat to local authority. Their interpretation serves to divest The City of its mandate to regulate land use on properties within its jurisdiction. Certainly, Valero cannot neuter our City and preclude Benicia from exercising its lawful authority over land use development issues on non-railroad-owned property within city limits.

The public, inclusive of professional engineers and refinery experts, have spoken to the exceptional hazards and risks of locating a crude off-loading rail terminal on Valero property that would pose a daily increased threat to the refinery itself as well as to the industrial park generally. The Final EIR glosses concerns raised regarding the degree of intensification of risk posed by siting the terminal adjacent to crude storage tanks and Sulphur Springs Creek, in a flood plain zone and active fault zone, and also directly across from companies along East Channel Rd. engaged in activities, often outdoors, involving heavy machining and arc welding [Benicia Fabrication & Machine Shop]; concrete fabrication and heavy diesel trucking [CONCO]; and gas and chemical supply, including gases the refinery uses [PRAXAIR]. I urge you to examine thoroughly the latest 89 page comment letter from Phyllis Fox, Phd., submitted on behalf of SAFER California on the failures of the Qualitative Risk Analysis provided in the FEIR.

The Benicia Industrial Park must be protected from becoming a de-facto train yard for Valero and/or a sacrifice zone in the event of a catastrophic accident caused by a derailed crude-loaded train. If a manifest freight train carrying beer to Biagi were to derail, we might have a keg party. But if a train derails loaded with flammable crude oil, you could have a powder keg and BLEVE explosion with a call for immediate evacuation. Recall that derailments have occurred in the Industrial Park in the last few years that have caused several hours of delays at Park Rd.

<u>Each time I have spoken to the EIR, I have endeavored to provide scenarios not addressed in the EIR. Tonight, I will provide yet another example:</u>

Within the tight confines that would be dedicated to rail terminal operations along Valero's eastern fenceline, two 50 car trains loaded with crude oil would be arriving and departing within a 24 hour period. According to the DEIR, it would take 12 hours to offload a single 50 car train, [DEIR p. 3-22]. This means that over a number of days or weeks Valero's preferred train arrival and departure times – requested of Union Pacific, but not guaranteed to avoid rush hours – would be thrown off by the minutes required for two trains to be moving in and out of the rail offloading racks So let's just say the schedule would be thrown off by at least a few minutes, in each consecutive 24 hour period, and more if there are problems. How many days would it take before two trains, one arriving, one departing, would be moving through the Park Road intersection and the industrial park, crossing private company driveways along Bayshore Rd. at rush hour? The DEIR didn't do the math.

A second concern: for an indefinite interval, two 50-car trains would simultaneously be "parked" on Valero property, one loaded train just arrived, idling on a side track waiting to enter the terminal, and the other, emptied, but with residual gases inside the tanks, getting ready to depart the terminal. Thus, a total of 100 tank cars could be "parked" on Valero property at one time, along with as many as six diesel locomotives, presumably with engines firing up or idling, but not counting other tank cars that could be sidelined nearby, holding ethanol or propane. This routine scenario would occur twice in a 24 hour cycle. The FEIR does not discuss this daily event and the potential additional hazards from fugitive emissions it represents, cumulative or catastrophic.

You must be concerned by the quality and quantity of the crude oil proposed to be imported by rail. For example: the DEIR offers no factual basis for its claim that there would be no net increases in emissions resulting from refining the crudes the Project would import. To the contrary, there are dangerous, known characteristics of tar sands dilbits and Bakken oil that the FEIR failed to disclose that relate to future crude blend processing as an indirect impact of the Project. The California Supreme Court has ruled that projected processing emissions estimates must be compared to current emission baselines, not to permitted emissions levels, which are much higher and were established 13 years ago by the VIP Project. For detail on this issue, read Greg Karras' most recent comment letter on behalf of Communities for a Better Environment regarding deceptive emissions

reporting and the FEIR's failure to account for the increase in emissions of neurotoxic and carcinogenic heavy metals, increases in energy and hydrogen consumption, and substantial increases in GHG emissions resulting from refining tar sands. All of these facts are vitally relevant to understanding the magnitude of the cumulative effects of this Project on Air Quality, and the critical importance of your decisions with regard to environmental protection, public health and safety. The Project description does not account for changes at Valero's port if and when "up to 82% of ships" importing crude oil would be eliminated. What project and business decision would follow from freeing up port capacity? Would production be ramped up for increasing exports of finished product to the Pacific Rim? What would be the environmental consequences and impacts of a greater expansion of port use as an indirect impact of the rail project? Any claimed GHG savings for the Project in the EIR would be erroneous.

As the commission did, you must uphold the principle goal of the Benicia General Plan for sustainable development. This Project is not sustainable in any sense. It does not reflect the goals of AB32, the California Global Warming Solutions Act. Commissioners rightfully concluded that the Crude By Rail Project is, essentially, <u>BAD FOR BENICIA, bad for people and places uprail and BAD for the planet.</u>

The Project is BAD for Benicia economically: it would add a real estate disclosure issue for residential and commercial properties. It would cast a dark cloud over public perception of Benicia's values: After all, putting all our eggs in One Big Future Super Fund Site as an investment basket is NOT wise. With a yes vote for this Project, the City sacrifices its potential for creating greater economic diversity to Valero's immediate interests in profit for their investors. The City may think of an immediate gain, but think again long-term: the City loses.

You are obliged to reject the FEIR based on CEQA requirements that call for a full Project Description, analysis of all foreseeable impacts and provide feasible, effective and enforceable mitigations for those projected significant impacts. The FEIR must provide feasible project alternatives that would reduce impacts overall. The FEIR deemed the NO PROJECT ALTERNATIVE as "environmentally superior." In good faith, each of you will make a decision about a project that if permitted would risk millions of lives and locales, including urban and rural centers, precious

rivers, forests, marshes, ag land — from here all the way to the sources of crude oil in North Dakota and Alberta, Canada.

We urge you to deny Valero's appeal, deny FEIR certification and deny the Project permit. A unanimous decision by this Council, echoing the Planning Commission, would be GOOD FOR BENICIA, Good for the State of California, Good for People and Good for the Planet.

Thank you for your consideration of our comments.

Marilyn Bardet
on behalf of Benicians For a Safe and Healthy Community

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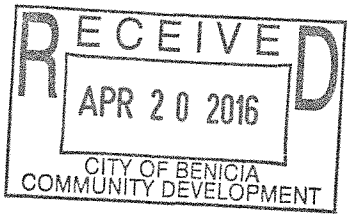
April 19, 2016



BY EMAIL

Honorable Mayor Patterson
and City Council Members
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Re: Valero Crude by Rail Project (12PLN-00063)

Dear Honorable Mayor Patterson and City Council Members:

We are writing on behalf of Safe Fuel and Energy Resources California ("SAFER California") to provide additional information for the City Council's consideration of Valero's appeal of the Planning Commission's unanimous decision to deny the Use Permit Application for the Valero Crude by Rail Project. On April 4, 2016 and April 18, 2016, we submitted comments on Valero's appeal and we provided additional information regarding the Project's significant impacts both within and outside the refinery boundary. Our comments included analyses from refinery expert Dr. Phyllis Fox. Attached are additional comments from Dr. Fox regarding the Project's significant air quality and public health impacts from operational emissions at the proposed unloading rack.[1]

[1] **Attachment A**: Letter from Phyllis Fox to Rachael Koss re: ROG and Benzene Emissions from Unloading Rack Operations, April 19, 2016.

3111-024rc

Thank you for your consideration.

Sincerely,

Rachael E. Koss

REK:ric

cc: Donald Dean, Chair, Planning Commission ddean@ci.benicia.ca.us
Amy Million, Principal Planner amillion@ci.benicia.ca.us

3111-024rc

ATTACHMENT A

Phyllis Fox
Ph.D., PE, BCEE, QEP
Environmental Management
745 White Pine Avenue
Rockledge, FL 32955
321-626-6885
PhyllisFox@gmail.com

April 19, 2016

Rachael Koss
Adams Broadwell Joseph & Cardozo
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Re: Impacts from ROG and Benzene Emissions from Unloading Rack Operations

Dear Ms. Koss:

As you requested, I have estimated ROG and benzene emissions and resulting health impacts from Valero's proposed unloading rack operations.

I. RAILCAR FUGITIVE EMISSIONS AT UNLOADING RACKS

I estimated ROG and benzene emissions from railcars for the entire time that railcars would be present within the Refinery boundary in my 4/4/16 comments.[1] In the present comments, I used the same basic methods to estimate ROG and benzene emissions from railcars only during unloading at the Valero unloading racks, using the methods previously described in my 4/4/16 comments. My analysis, presented below, indicates that ROG emissions are significant. Further, benzene present in these emissions result in significant cancer risk and acute health impacts at nearby sensitive receptors.

[1] 4/4/16 Fox Comments, Comments II and III.

A. ROG Railcar Fugitive Emissions During Unloading are Significant and Unmitigated

The unloading scenario described in the EIR indicates "UPRR would turn over operation of the trains to Valero for offloading." Valero would drain the contents of each tank car by gravity into a collection pipe (collection header) and then pump the contents directly into storage tankage located in the Refinery's crude oil storage tank field. When emptied, UPRR would move the tank cars onto the departure spur on the Refinery property adjacent to the unloading rack, where they would be assembled into a 50-car unit train for transport off site. [2]

The unloaded crude oil would be pumped into a new 4,000 foot, 16-inch diameter pipeline between the unloading rack and an existing crude supply pipeline to the Valero Crude Tank Farm for storage.[3] The pump would have a maximum crude oil pumping rate of 4,000 gpm.[4] Thus, the minimum amount of time that the railcars would be at the unloading rack, under Valero control, would be 6 hours,[5] assuming maximum pumping rate. In general, the pump would not be operated at maximum capacity, so the time at the rack under Valero control would be longer.

Using emission factors developed by EPA for marketing terminals, as assumed in Valero's railcar fugitive emission calculations but corrected as noted in my FEIR comments, the on-site ROG emissions per 50-car unit-train during unloading operations controlled by Valero at the Valero unloading rack would be 399 pounds (lb) per visit,[6] 798 lb/day, and 146 ton/yr.[7] The CEQA significance thresholds for ROG emissions established by the Bay Area Air Quality Management District (BAAQMD) are 54 lb/day and 10 ton/yr.[8] Thus, both daily and annual on-site ROG railcar fugitive emissions during unloading operations controlled by Valero at Valero's unloading rack are highly significant and must be mitigated.

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[2] DEIR, p. 3-21.

[3] RDEIR, p. 2-6.

[4] RDEIR, p. 42.

[5] The time to unload 35,000 bbl per unit train = (35,000 bbl)(42 gal/bbl)/4,000 gal/min = 367.5 min = **6.13 hrs.**

[6] Exhibit 1a, cell: I31.

[7] Annual railcar ROG emissions for two 50-car unit trains per day, 365 days/year using marketing terminal emission factors = [(399 lb)/(50-car train) × (2 × 50-car trains/day) × (365 day/yr)]/(2000 lb/ton) = **145.6 ton/yr.**

[8] FEIR, Table 4.3-9.

A. Benzene Railcar Fugitive Emissions During Unloading Are Significant and Unmitigated

The EIR did not include benzene emissions from railcar fugitive emissions during unloading in the health risk assessment. I estimated these emissions for the entire time that the railcars would be within the Refinery boundary in my 4/4/16 comments.[9]

As I previously explained, benzene has been reported in Bakken crude oils at up to 7 wt. %. Assuming that 80% of the VOCs are ROG, benzene emissions could be up to 70 lb/day or 13 ton/yr during railcar unloading.[10] These revised benzene emissions are substantially higher than those included in the revised health risk assessment from conventional fugitive sources (such as valves and pumps): 0.062 lb/day and 0.01 ton/yr.[11]

I revised the risk calculations in Exhibit 2a to include benzene emissions from railcars during unloading alone. My calculations are summarized in Table 1 and documented in Exhibit 2a (Tab: Rev. Calcs).

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[9] 4/4/16 Fox Comments, Comment III.

[10] Benzene weight percent (7%) is reported based on VOC emissions. ROG emissions are a subset of VOC emissions. Conservatively assuming that 80% of VOC is ROG, the maximum benzene emissions = [399 lb ROG/visit)(2 visit/day)/(0.8 ROG/VOC)] × (0.07 benzene/VOC)= **69.83 lb/day.**

[11] Amy Million, City of Benicia, Email to Rachael Koss, Adams Broadwell Joseph & Cardozo, Re: Modeling Files for Valero CBR - Adams Broadwell Request, February 2, 2016, 1:24 pm. ("Some files have been sent to you via the YouSendIt File Delivery Service. Download the file -... Updated Refinery HRA Calculation Jan 2016.xlsx...") (Exhibit 6 to 4/4/16 Fox Comments.) *See* also summary in Exhibit 1b, Tab Rev. Calcs.

Table 1: Revised Health Risk Calculations for Emissions of Benzene from Railcar Fugitive Emissions During Unloading.

	Benzene Emissions (lb/day)	Chronic Hazard Index	Acute Hazard Index	Cancer Risk	Revised Benzene Emissions (lb/day)	Chronic Hazard Index	Acute Hazard Index	Cancer Risk
	EIR Health Risks Benzene				Revised Health Risks Benzene			
Resident	6.17E-02	0.00	0.00	9.42E-09	69.83	0.0	**4.2**	**1.07E-05**
Worker	6.17E-02	0.00	0.08	2.18E-08	69.83	0.9	**89.8**	**2.47E-05**
Daycare	6.17E-02	0.00	0.00	3.87E-09	69.83	0.0	0.1	**4.37E-06**
Elementary School	6.17E-02	0.00	0.00	3.87E-09	69.83	0.1	0.5	**4.37E-06**
	EIR Health Risks All TACs				Modified Health Risks All TACs*			
Resident		0.00	0.01	2.20E-06		0.0	**4.2**	**1.28E-05**
Worker		0.02	0.16	7.40E-06		0.9	**89.9**	**3.20E-05**
Daycare		0.00	0.00	2.52E-07		0.0	0.1	**4.62E-06**
Elementary School		0.00	0.00	2.23E-07		0.1	**0.5**	**4.59E-06**

*Assumes all emissions are estimated correctly except benzene. Highlighted/**bolded** cells indicate significant health risks (acute and chronic hazard index equal to or greater than 1.0; cancer risk equal to or greater than 1.0E-05.)

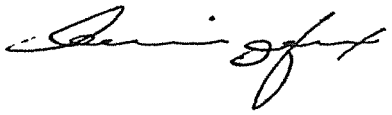
This table shows that benzene emissions from railcar unloading fugitive emissions under the control of Valero at the unloading racks result in significant cancer risk and acute health impacts at the MEIR (nearest resident) and MEIW (nearest worker). When emissions of all other TACs are included, health risks are even higher. Thus, Valero owned and operated facilities, the unloading racks, pose significant health risks, and result in significant health impacts, for nearby residents and workers.

II. OTHER UNLOADING EMISSIONS

Other emission sources during unloading include: (1) fugitive component ROG and TAC emissions on equipment that connects the unloading rack to the storage tanks -- pumps, valves, flanges, connectors, and pressure relief valves; (2) coupling and uncoupling emissions when the railcars are connected and disconnected to/from the unloading racks; (3) evaporation of crude oil drips, drops, and larger spills during the coupling/decoupling process; and (4) sump emissions. The DEIR included pumps, valves, flanges, connectors, and pressure relief valves on facilities used to transport the

crude oil to storage tanks[12] but not the other sources of loading rack emissions, including coupling/decoupling emissions; spills; and sump emissions. Thus, the EIR fails as an information document as it did not include all ROG and TAC emission sources associated with unloading.

In sum, on-site ROG and benzene emissions from Valero owned and controlled facilities and operations, the loading racks and unloading of railcars, would result in significant air quality and public health impacts. These impacts were not disclosed or mitigated in the EIR.



Phyllis Fox

[12] DEIR, Table 3-4 and pdf 1179.

Ex. 1a

ARRIVING RAIL CARS					Using Oil & Gas Production Emission Factors		Using Marketing Terminal Emission Factors	
Component	Service	Equipment Count per Railcar	Number of Railcars	Loading Rack (hrs)	Emission Factor (kg/hr/comp)	ROG Emissions (lb/visit)	Emission Factor (kg/hr/comp)	ROG Emissions (lb/visit)
Pressure Relief Valve	Gas	2	50	6.1	0.8316	895	0.138	148
Valve	Light Crude Oil	1	50	6.1	0.0707	38	0.023	12
Valve	Gas	3	50	6.1	0.1386	224	0.023	37
Connectors	Gas	9	50	6.1	0.0259	125	0.034	165
Connectors	Light Crude Oil	2	50	6.1	0.0234	25	0.034	37
Total Railcar Fugitive ROG Emissions at Loading Racks						**1307**		**399**

(1) Emission factors from CARB 1999, Table IV-2e for >/= 10,000 ppmv.

(2) Calculations assume 80% of VOCs are ROG.

(3) The RDEIR indicates that the maximum pumping rate is 4,000 gpm. RDEIR, p. 42 (pdf 327).
Thus, the time to unload 35,000 bbl/day (1 50-car unit train) = 35,000 bbl x 42 gal/bbl/4,000 gal/min = 367.5 min = **6.13 hrs.**

Exh. 2a

	Benzene Emissions (lb/day)	Chronic Hazard Index	Acute Hazard Index	Cancer Risk	Revised Benzene Emissions (lb/day)	Chronic Hazard Index	Acute Hazard Index	Cancer Risk
	EIR Health Risks Benzene				Revised Health Risks Benzene			
Resident	6.17E-02	0.00	0.00	9.42E-09	69.83	0.0	4.2	1.07E-05
Worker	6.17E-02	0.00	0.08	2.18E-08	69.83	0.9	89.8	2.47E-05
Daycare	6.17E-02	0.00	0.00	3.87E-09	69.83	0.0	0.1	4.37E-06
Elementary School	6.17E-02	0.00	0.00	3.87E-09	69.83	0.1	0.5	4.37E-06
	EIR Health Risks All TACs				Modified Health Risks All TACs*			
Resident		0.00	0.01	2.20E-06		0.0	4.2	1.28E-05
Worker		0.02	0.16	7.40E-06		0.9	89.9	3.20E-05
Daycare		0.00	0.00	2.52E-07		0.0	0.1	4.62E-06
Elementary School		0.00	0.00	2.23E-07		0.1	0.5	4.59E-06

* Assumes all emissions are estimated correctly except benzene

Highlighted cells: significant health risks (acute and chronic hazard index equal to or greater than 1.0; cancer risk equal to or greater than 1.0E-05

Question for tonight

Decide now, or decide later?

If delay, still have to answer if FEIR is adequate, so when ?

1. Discuss Valero request for delay – delay is a can of worms because:

2. If vote yes for delay

    a. provide date certain
        i. can delay go on indefinitely – is there a public right to decision?
    b. what exactly is being asked: City does not disagree with federal preemption on rail operations; so Valero would petition STB on the extent of "indirect preemption" for local government and land use.
    c. Once Valero files a petition on that point, there will be numerous parties - cities, states (state rights) interested in weighing in and could delay STB or
    d. STB could do as they did in SEA 3 – land use decisions not affecting rail operations are not subject to preemption.
    e. STB could simply say such opinion is not "ripe".
    f. **City has no control over timing of petition nor framing of the question.**

    Thus staff has recommended a time certain date to take action on the appeal – September is recommended. If STB is still "working" its way through the petition and all the parties weighing in on it and therefore not ready to write

opinion, then what is gained by the city with the delay – more delay or decision without the opinion

3. If "no" on delay, Valero can still file petition – they may be motivated to if appeal is denied.

4. Regardless of yes or no for delay, should the council continue discussion FEIR and land use permit **tonight?**

    a. Option A: "yes", while documents are fresh in minds, consultants are here and to delay could cause twice or more the work necessary to address these issues.
    b. Option B: "no", finish with date certain in September (or whenever, 2017?)

5. If "yes" on delay AND finish discussing issues raised for FEIR, council action is unclear. Does this mean that in September more issues could be raised?

6. If "yes" on delay, "no" on date certain and "no" on finishing answering and discussing FEIR, then this could be revisited at future date with new staff, new council members and changing circumstances.

The question for tonight is decide now or decide later.

Mayor Elizabeth Patterson
April 19, 2016

Train arrives from Roseville

1. 50 car train with locomotives arrive on Track 700
2. 50 car train switches to Track 732 (arrival track)
3. 25 cars and locomotive spotted at Track B for offloading
4. 25 cars and locomotive spotted at Track C for offloading

Offloading complete

5. 25 Track B cars and locomotive relocated to Track D (departure track)
6. 25 Track C cars and locomotive combined with cars on Track D to make up 50 car train

2nd train arrives from Roseville

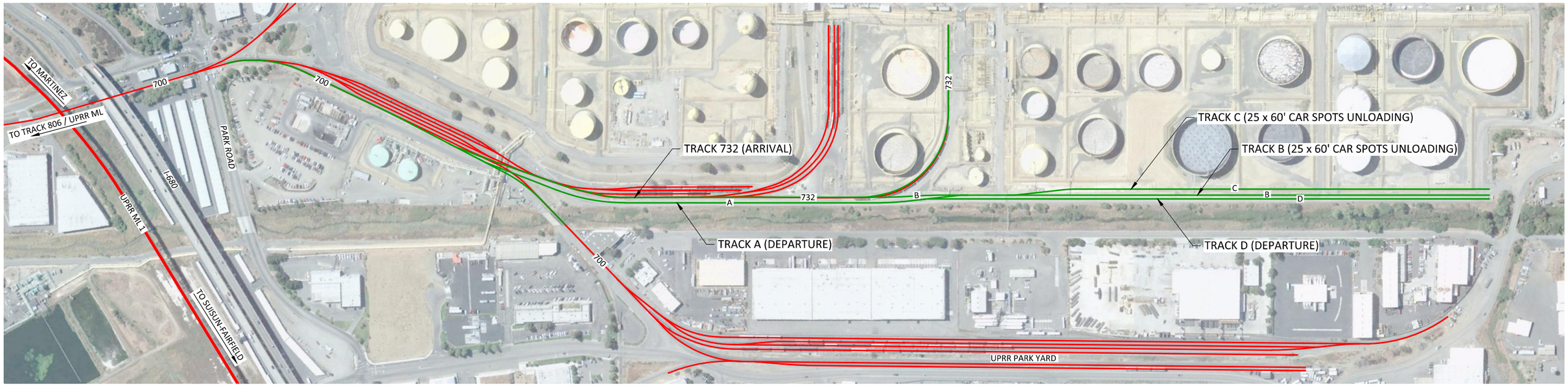
7. 50 car train with locomotives arrive on Track 700
8. 50 car train switches to Track 732 (arrival)
9. 25 cars and locomotive spotted at Track B for offloading
10. 25 cars and locomotive spotted at Track C for offloading

Empty train departs

11. Engineers from arriving train prepare to operate 50 car train on Track A/D
12. 50 car train and locomotives depart on Track 700

Note:

Submitted by Diane Sinclair



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SCALE 1" = 400 FEET

TRACK LEGEND

Existing Track
Proposed Track

FOR INFORMATION ONLY NOT FOR CONSTRUCTION

VALERO

VALERO ENERGY CORPORATION
BENICIA, CA
EXHIBIT 1: RAILROAD TRACK LAYOUT
OCTOBER 25, 2013

Amy Million

From: Ed Ruszel <eruszel@ruszelwoodworks.com>
Sent: Tuesday, April 19, 2016 11:17 AM
To: Christina Ratcliffe
Cc: Elizabeth Patterson; Mark Hughes; Christina Strawbridge; aschwatzman@ci.benicia.ca.us; Tom Campbell; Heather McLaughlin; Brad Kilger; Amy Million; mjbardet@comcast.net; 'Mildred Brennan'; rogrmail@gmail.com; Jruszel@ruszelwoodworks.com; john47bunch@gmail.com
Subject: Point of Order

Valero Crude By Rail Project
Valero Appeal to the City Council
April 18th, 2016

I am writing to add to the public record my concerns about **New** information that was presented to the Council, after the close of the public comments.

The discussion regarding traffic and rail movement was extremely important as the written documents do not cover the subjects in any great detail.

It was very distressing to see representatives of Fehr and Peers not just be given the opportunity to answer questions from the Council but then be given the time to present a prepared Power Point Presentation at 11:00pm!
On top of that, Chris Howe of Valero was able to crowd the mic without a request from the Council to add comments regarding upgrades to switches and how it would help "other than Project" related train traffic.

I feel very strongly that this is substantial new information, that should have been more thoroughly addressed early on in the DEIR, RDEIR, and FEIR.
The public is at a disadvantage in not being able to consider this new information and then make verbal comment when appropriate.

As you may know, I have been very diligent in my review of the Transportation and Traffic sections of this project and believe that public comment should be reopened to address this most important subject.

If the council deny' s Valero's appeal my concerns are mute. A delay of the hearing for a determination by the STB would reopen the door for additional public comment, and the Transportation and Traffic review would be one of the most affected issues.

Sincerely
Ed Ruszel

Dear Mayor Patterson and City Council Members,

After having listened to the discussion at last night's Public Hearing, I felt compelled to ask you once again NOT to delay these proceedings any longer by denying Valero's request for an STB Hearing. If you've researched the purpose and jurisdiction of the STB, you are already aware of why doing this would not be applicable to our land-use circumstances. Any decision, if they would deem it within their purview to offer one, which remains questionable, would be only an opinion and not legally binding. Also, it's important to take into consideration that we have compelling "on-site, non-railroad issues" that are enough of a reason to deny the CBR Project.

I also request denial of the FEIR, which has been widely considered to be inadequate due to erroneous information presented, in addition to objections concerning significant information that was obscured or omitted by this document. The majority of those who reviewed and responded to it, including numerous experts, have claimed inadequacy for a number of verifiable reasons which have already been stated in prior comments. Even the Attorney General of California, Kamala Harris, has weighed in heavily on this matter, reinstating this complaint in her letter dated April 14, 2016, due to the fact that prior EIR concerns presented in her initial letter were not addressed in the FEIR. Many of us who offered public comments after having read the documents and researched beyond them also received erroneous and/or dismissive replies to relevant questions which still would need to be addressed if the city decides to certify the CBR Project.

Another issue that may not have been brought up in prior comments is that a CEQA review has to offer feasible alternatives to the the project desired. According to our city's interpretation of federal preemption, the CEQA Review did not comply with this. The "No Project Alternative," although considered by the city and the ESA consultants to be the environmentally superior one is not considered viable. Doesn't a viable alternative need to be offered for the CEQA requirements to be met?

The city's right and responsibility to be able to deny the Valero CBR Project has been validated by our own California Attorney General, Kamala Harris. Yet the Valero lawyer, Mr. Flynn, and the city's consulting lawyer, Mr. Hogin, are in direct opposition to her legal guidance and ALL other legal advice received during Public Hearings on the subject of federal preemption of the railroads as it would apply to our particular city's circumstances, including "on site" issues such as footprint available for project, and the variety of health and safety concerns already stated in former comments. Valid reasons for opposing this project go beyond the railroad portion of the proposal.

When reviewing this matter, it's important to be aware of the fact that Mr. Hogin's legal fees are being reimbursed by Valero. A conflict of interest may be operating here which needs to be taken into consideration when evaluating Mr.Hogin's and Valero lawyer, Mr. Flynn's, opinions on the subject. The other legal attorney opinions offered during the public commenting process have no such personal financial incentive attached. Instead, their comments have been focused on the city's right and ultimate responsibility to

protect our welfare in regard to health and safety issues.

ISN'T IT TRUE THAT ANY CITY GOVERNMENT'S FIRST AND FOREMOST CONCERN AND SACRED OBLIGATION IS THE HEALTH AND SAFETY OF IT'S COMMUNITY? All decisions need to be evaluated through this lense. The city is under no obligation to accept this or any other project if it deems "the benefits do not outweigh the significant and unavoidable hazards."

Your wisdom is being relied upon not only for Benicia, but for all the communities up and down rail from us who irrevocably fall under the umbrella of this decision. We are all connected and affected by the choice you will make. We share the air, waterways and the sense of community beyond our boundaries. The frames and borders we claim as cities are, in truth, artificial in circumstances such as the ones being faced in this matter. I ask that their ardent requests also be taken into consideration when making this decision, that once, made can not be undone. I stand in solidarity with all those who oppose the CBR Project for verifiable health, safety and sustainability reasons, no matter where they reside.

Sincerely,

Judith Sullivan
37 year resident of Benicia

Community Development Department
MEMORANDUM

Date: April 20, 2016
To: City Council
From: Amy Million, Principal Planner
Cc: File
Re: **Correspondence- Vote "No"**

On April 19, 2016 the following phone messages were received regarding the Valero Crude by Rail Project:

1. Barbara Ramano – She urges Council to vote "no".
2. Nancy Lund – She urges the Council to vote "no".

Amy Million

From: Ethan Buckner <ethan@stand.earth>
Sent: Tuesday, April 19, 2016 8:18 PM
To: Christina Ratcliffe; Mark Hughes; Christina Strawbridge; Alan Schwartzman; Tom Campbell; Heather McLaughlin; Brad Kilger; Amy Million; Roger Straw; Jack Ruszel; john47bunch@gmail.com; Ed Ruszel
Subject: [URG] Positive Train Control Implementation
Attachments: Deadline for train safety technology undercut by industry lobbying - The Washington Post.pdf

FYI, Union Pacific & the rail industry has been delaying and obstructing the implementation of positive train control for years.

https://www.washingtonpost.com/local/trafficandcommuting/deadline-for-train-safety-technology-undercut-by-industry-lobbying/2015/10/25/f893446a-2720-11e5-b77f-eb13a215f593_story.html

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Ethan Buckner
Extreme Oil Campaigner
Mobile: 612-718-3847
Twitter: @ethanbuckner
stand.earth

STAND.earth
FORMERLY FORESTETHICS

The Washington Post

Transportation

Deadline for train safety technology undercut by industry lobbying

By Ashley Halsey III **and** Michael Laris October 25, 2015

Until a train barreled off the tracks at 9:26 p.m. on May 12, it had been business as usual on Capitol Hill. Among the bills quietly making their way toward a final vote was one that would postpone by several years a multibillion-dollar safety-enhancement deadline facing the railroad industry.

A victory for the railroads, which maintain one of the most powerful lobbying efforts in Washington, seemed all but certain and likely to be little noticed outside of the industry.

But at that moment, an Amtrak train hurtling toward New York City derailed in Philadelphia, turning into a tangle of crushed metal that killed eight passengers and injured 200 more.

Everyone — including the railroad and federal investigators — agreed that the catastrophe could have been prevented by a single innovation called Positive Train Control (PTC). It's an automatic braking system that federal regulators call "the single-most important rail safety development in more than a century."

Now, after a period of reflection and several inquiries, Congress once more is on the brink of postponing the deadline for use of PTC. The proposed delay — until at least 2018 — comes in a new regulatory era for the railroads. Trains filled with volatile natural gas or oil have derailed seven times so far this year, and there is fear that one could cause catastrophic explosions as it passes through a city.

A mighty lobby

What has taken place since May provides insight into the influence that effective lobbyists wield in Washington and how ready access to members of Congress has helped one industry fend off a costly safety mandate.

Seven years ago, Congress ordered railroads to have PTC installed by the end of 2015. It was an uncomfortable deadline for the industry, one it argued should be postponed. PTC technology was too complex, the railroads said, and the $14.7 billion cost to equip freight and commuter lines was prohibitive. Federal economists put the

cost-benefit ratio at about 20 to 1.

With their lobbyists in overdrive in 2008, the railroads might have persuaded Congress to delay the mandate. But in the middle of that debate, a head-on train collision in California killed 25 people and injured 102 others. The National Transportation Safety Board said PTC could have prevented the accident, and that moved lawmakers to settle on the Dec. 31, 2015, deadline.

The NTSB says it has investigated 145 rail accidents since 1969 that PTC could have prevented, with a toll of 288 people killed and 6,574 people injured.

In the years since Congress moved to finalize the deadline in 2008, the railroad industry has spent $316 million, according to the Center for Responsive Politics (CRP), to maintain one of the most savvy lobbying teams in Washington. It also contributed more than $24 million during the same period to the reelection efforts of members of Congress, targeting in particular the chairmen and members of key committees that govern its business.

In 2011, the chairman of the House subcommittee on railroads spoke out at a hearing, denouncing the PTC mandate as "an example of regulatory overreach." He said PTC would have "a very, very small cost-benefit ratio."

Since then, that chairman, Rep. Bill Shuster (R-Pa.), has risen to lead the full House Transportation Committee. Late last month, he introduced a bipartisan bill to extend the PTC deadline to at least 2018, and beyond if the "railroads demonstrate they are facing continued difficulties."

"Railroads must implement this important but complicated safety technology in a responsible manner, and we need to give them the necessary time to do so," Shuster said in a statement announcing the bill.

Since taking office in 2001, Shuster has received campaign contributions of $446,079 from the railroad industry, according to the CRP, with $141,484 of it coming in the 2013-2014 election cycle.

Money flows readily to the chairs of powerful committees, but other members of the House Transportation Committee also have benefited from railroad contributions. In the 2013-2014 election cycle, committee members received more than $1.25 million in direct contributions to their campaigns. As of the end of September, the railroads had pitched another $721,742 at the House committee members.

The Senate also has benefited from the railroad industry's largesse, according to the CRP, with 77 senators receiving nearly $1.5 million in campaign contributions in 2013-2014.

Outside the Beltway, massive contributions may sound like the cost to buy a vote in Congress. But in this era of mega-money politics, campaign contributions win something almost as valuable for railroad lobbyists: face time with a member of the House or Senate.

"They call and they get a member meeting right away," said a senior Senate staff member familiar with the process. "They have a lot of access."

And that access brings into play what are described as some of the best lobbyists on Capitol Hill, including several dozen who once were staff members or lawmakers in Congress.

Rep. Peter A. DeFazio (Ore.), the ranking Democrat on the Transportation Committee and the recipient of more than $70,000 in railroad campaign money since 2013, says it's the footwork of the lobbyists, not the campaign contributions, that wins the day.

"In these days, when you have one Wall Street billionaire spend a million bucks [on a campaign], getting a few thousand dollars from a railroad?" he said with a shrug. "The railroads invest a lot of time on the Hill, and they present a pretty good story for the most part."

Oil boom raises the stakes

Rail safety has never been a more pressing issue than it is today. So far, the people who have died in U.S. accidents that PTC could have prevented have generally been crew members or passengers. That could change in dramatic, catastrophic fashion.

The number of rail tank cars carrying flammable material in the United States has grown from 9,500 seven years ago to 493,126 last year, thanks to the boom in domestic oil produced in the Bakken oil fields.

Those trains rumble from the oil fields in Montana, North Dakota and Saskatchewan, Canada, to refineries on the East, West and Gulf coasts.

This year, seven trains have derailed, either leaking their contents or exploding. All of the U.S. explosions have come in remote rural areas where the erupting fireballs did little damage.

Canada was not so lucky.

In July 2013, a runaway freight train carrying 74 tank cars full of Bakken oil derailed in the town of Lac-Mégantic, setting off an inferno that destroyed 30 downtown buildings and killed 47 people.

Coastal states in the United States and the city of Chicago, the most important railroad hub in the nation, have come up with scenarios that depict the potential damage and death tolls should a train explode in different sections of their urban areas. Chicago, fearing that the plan's release could cause panic, has declined to make it public.

Sarah Feinberg, acting head of the Federal Railroad Administration, says that worries of a train exploding in the middle of a city have caused her sleepless nights.

"If PTC is not fully implemented by Jan. 1, 2016, we can and should expect there to be accidents in the months and years to follow that PTC could have prevented," she told the House subcommittee on railroads in June.

Bob Gildersleeve Sr., whose son Bob, a Maryland father of two, was killed in the May crash, said rail companies seem to be evading the mandate with an attitude of: "What are you going to do about it?"

"Is a deadline a deadline?" Gildersleeve asked. "We're talking about fixing things that will eventually save lives, and you guys haven't done it. Why?"

Many railroads far behind

The railroads' pitch for an extension — both loudly in the media and quietly to Congress — has been straightforward. Unless the deadline is postponed:

"Transportation of all goods over freight rail grinds to a halt; the U.S. economy loses $30 billion; household incomes drop by $17 billion; 700,000 Americans lose their jobs; millions of commuters are stranded."

That was the message Oct. 19 when officials from three commuter rail lines and Association of American Railroads President Ed Hamberger held a conference call with reporters to add their voices to a chorus calling for an extension of the PTC deadline.

"If the congressionally mandated deadline of Dec. 31 is not extended, there will be a transportation crisis in the

country with severe economic consequences," said Michael Melaniphy, president of the American Public Transportation Association.

The call had an unintended subtext; all three of the commuter rail lines represented — Virginia Railway Express, Chicago's Metra system and California's San Joaquin Regional Rail Commission — said their installation of PTC would be substantially complete by the end of 2015. Amtrak also promises to have PTC operating in the Northeast Corridor rails that it owns by the current deadline.

But most passenger trains operate on track that's owned by the freight railroads, and the freight rail lines are far from ready to meet the deadline. The freight companies say that without an extension, all traffic on their lines must halt to comply with the law.

The railroads say they've already spent $5.7 billion on PTC installation and are committed to finishing the job. None will meet the Dec. 31 deadline.

"It doesn't matter how fast the bear is that's chasing you, if you're running as fast as you can, you can't run any faster," said Frank Lonegro, vice president of the freight rail carrier CSX, which operates more than 21,000 miles of rail in 23 eastern states, Washington and two Canadian provinces.

Some of the big railroads have made progress, while others lag far behind.

One of the largest, the BNSF Railway, has made substantial progress. At the other end of the spectrum, Union Pacific hasn't fully equipped any of its 6,532 locomotives, according to a Federal Railroad Administration report

released in August.

"Union Pacific is pretending [the deadline] is not happening," said one federal official who reviewed the report.

Union Pacific spokesman Aaron Hunt says that "integrating these technologies into an interoperable system is very difficult," much like merging medical records into a computerized system, and that the company already has made a $1.7 billion investment, including work on the bulk of its locomotives.

Lonegro's colleague, CSX spokesman Rob Doolittle, said railroad lobbyists have been telling Congress for years that a 2015 deadline wasn't realistic.

"In the early conversations, before the law was passed, the industry was identifying 2018 as a reasonable deadline that we thought we could achieve," he said.

A federal official familiar with those 2008 negotiations offered a different perspective.

"The railroads were in the room, and [Association of American Railroads] and those guys were the ones who said 2015 was doable. They did not embrace the deadline, but they said it was a fair bill," said the official, who spoke on the condition of anonymity because of involvement in the current negotiations.

"It certainly wasn't, 'Oh, we sprung it on the railroads at the last minute,' as they would like some to believe," said a staff member who was in the room while the deal was being struck.

When the final regulations were put in place nearly six years ago, federal officials tallied up the expected benefits of having the automatic braking system in place. The cost-benefit analysis put a price tag on crumpled locomotives, train delays, track damage, evacuation costs, the cleanup of hazardous spills and other consequences of the crashes that could be prevented.

Government economists also sought to calculate the human costs in injuries and deaths, using a figure of $6 million for each life that was expected to be saved. Over 20 years, there would be $269 million in savings, they figured, or the equivalent of 45 lives spared. There would be another $200 million in prevented injury costs.

In all, they projected $674 million in safety benefits from the PTC system. It would cost $13.2 billion over 20 years, including maintenance costs, to net those benefits, the economists calculated.

That came out to a cost-benefit ratio of about 20 to 1, a disconnect seized on by railroad executives, lobbyists and lawmakers sympathetic to their needs, such as Rep. John J. Duncan Jr. (R-Tenn.).

"Now, everybody has tremendous sympathy for those families that lost loved ones in the Amtrak accident, but my goodness, now we're going to be spending billions to make something that already is one of the safest things in the entire world [safer]?" Duncan, who has received $303,250 in railroad campaign support during a 27-year career in the House, said at a June hearing. "And I'm thinking that we would be better off to spend those billions in many, many other ways — cancer research, and everything else."

But federal rail officials and some outside experts argue that the technology needed to prevent crashes ultimately can transform the future of railroading. More frequent trains, more efficiently deployed across the country, could move more goods while cutting down on expensive fuel costs, dramatically increasing potential benefits.

Some industry executives have embraced this future, while others have pushed back. In a conference call with Wall Street analysts just 19 days before the Amtrak derailment, Union Pacific's president and chief executive, Lance M. Fritz, predicted Congress would extend the deadline, adding that his company's lobbyists were "giving feedback and input into our thoughts to help navigate that process."

Dan Keating contributed to this report.

Ashley Halsey reports on national and local transportation.

Mike Laris came to Post by way of Los Angeles and Beijing. He's written about the world's greatest holstein bull, earth's biggest pork producer, home builders, the homeless, steel workers and Italian tumors.

Amy Million

From: Charles Davidson <charlesdavidson@me.com>
Sent: Tuesday, April 19, 2016 5:26 PM
To: Amy Million
Cc: Charles Davidson
Subject: Fwd: Valero CBR FEIR: Please fwd to entire City Council - A Spill of Diluted Bitumen and the 2010 Kalamazoo River Enbridge Pipeline DilBit Spill

From: Charles Davidson <charlesdavidson@me.com>
Date: April 19, 2016 3:43:48 PM PDT
Subject: Re: Valero CBR FEIR: Please fwd to entire City Council - A Spill of Diluted Bitumen and the 2010 Kalamazoo River Enbridge Pipeline DilBit Spill

Re: Please fwd to entire City Council - A Spill of Diluted Bitumen and the 2010 Kalamazoo River Enbridge Pipeline DilBit Spill
To: The Benicia City Council
From: Charles Davidson. Hercules CA

Greetings.

Last night, in Council session, the Mayor requested information on diluted bitumen / DilBit oil spills.

Here are a few quick reads, that I have prepared for the full Benicia City Council.

Included are both an OpEd Layperson-level piece and a University Research (with NOAA; Nat. Oceanic and Atmospheric Admin.) report on Diluted Bitumen spill behavior in an aquatic environment; plus two charts.

It is my pleasure to help the Council decide this important decision, by helping to provide you with what I see as critical information regarding health and safety of DilBit refining and transport.

In short: Because of the need to combine lightweight chemical solvents with early solid bitumen, in order to get it to float, a DilBit spill will sink deeply within both the soil and a freshwater aquatic environment.

When the lightweight solvents evaporate, they leave behind in the soil or below the river's bottom, the original asphalt-like bitumen, leaving it a considerable distance underground (where it becomes fully adhesive and reverts to a solid phase that cannot effectively be remediated).

A surface containment boom is useless for DilBit, that sink, versus ia booms effectiveness for spilt lightweight oils that float on water.

Regards,

http://thetyee.ca/News/2012/03/05/Diluted-Bitumen/

Spill from Hell: Diluted Bitumen | The Tyee

Sunken tar sinks to bottom

As the lighter chemicals evaporated into the surrounding area, the bitumen portion began to sink to the bottom and become mixed with river sediments. Conventional clean-up equipment such as skimmers and oil booms proved useless in recovering the large amounts of submerged oil that now covers an area of river bottom estimated to be approximately 200 acres.

"This was the first time the EPA or anyone has done a submerged cleanup of this magnitude," Ralph Dollhopf, the EPA Incident Commander for the Kalamazoo spill told the local media.

"I would never have expected... that we would have spent two or three times longer working on the submerged oil than surface oil. I don't think anyone at the EPA anticipated that, I don't think anyone at the state level anticipated that, I don't think anyone in industry anticipated that."

In the absence of any previous experience in dealing with spilled Alberta bitumen, the EPA had to "write the book" on figuring out how to recover large amounts of oil that doesn't float.

Twenty months after the spill these expensive recovery efforts continue, and 30 miles of the Kalamazoo River impacted by the spill remain closed to swimming, boating, fishing or even wading for the foreseeable future. A recent video details the aftermath of the spill on local residents.

Clean-up 10 times what oil spills cost

Enbridge now estimates that clean up costs of the bitumen spill will cost more than $720 million. The company exceeded their insured clean-up coverage of $600 million last fall and the clean up is far from over. Compared to other spills of heavy oil, this Kalamazoo bitumen spill has been colossally expensive. A study of historic oil spills in the U.S. reported the average clean-up cost for heavy crude of $18.95 per litre. The Kalamazoo spill has so far cost over 10 times that much and counting.

Clean-up effort, July 2010, in Ceresco, Michigan. Kalamazoo River remains closed to even wading, 20 months after spill.

Transporting Alberta's Oil Sands Products: Defining the Issues and Assessing the Risks

Shanese Crosby[a,b] Robin Fay[a,b]
Colin Groark[a,b] Ali Kani[b,c]
Jeffrey R. Smith[b,d] Terry Sullivan[a,b]

March 17, 2013

[a]Evans School of Public Affairs, University of Washington
[b]Program on the Environment, University of Washington
[c]Foster School of Business, University of Washington
[d]School of Environmental and Forest Sciences, University of Washington

Transporting Alberta's Oil Sands Products 2 **Acknowledgments**

We would first like to thank Dr. Robert Pavia of the University of Washington's School of Marine and Environmental Affairs and Dr. Gary Shigenaka of **NOAA** for their guidance and continued support. This project would not have been possible without their help and involvement. We would also like to thank the Program on the Environment at the University of Washington and Doug Helton of NOAA for establishing this project and helping to guide it.

In order to transport bitumen, a diluent must be added to decrease the viscosity. The most commonly used diluent is natural gas condensate, a liquid byproduct of natural gas processing. Typically the mixture of diluent and bitumen (dilbit) consists of 30% diluent and 70% bitumen…

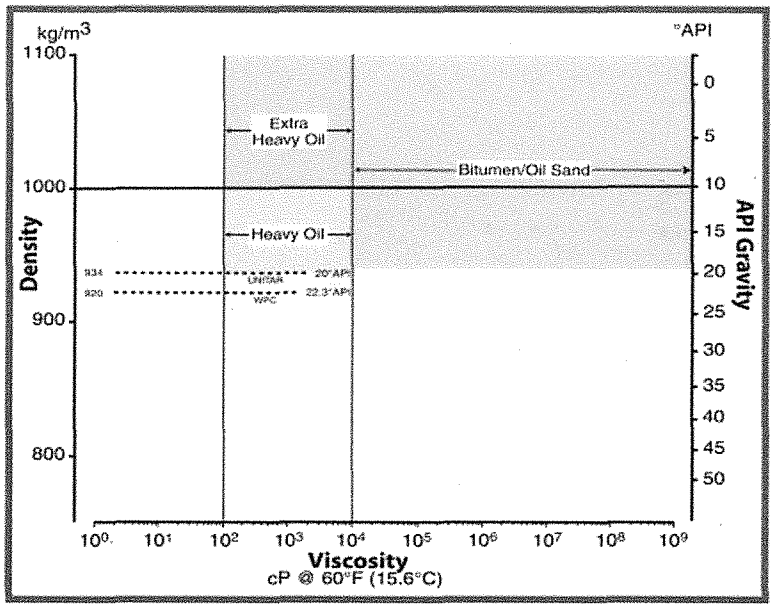
There is also concern that the recently drafted PHMSA contingency plans for pipelines are not well integrated with regional and area plan as required. In addition, while many current regulations give agencies the authority to effectively regulate bitumen products, problems can arise from a lack of resources and experience dealing with potentially non-floating oils.

Risks of Transporting Oil Sands Products 70

5.3.2.2 Freshwater

The most well documented example of a dilbit spill into freshwater is the Enbridge spill into Michigan's Kalamazoo River, which included both Cold Lake Blend and Western Canadian Select crude oil condensate mixtures. These dilbit blends have a reported specific gravity of 0.65 to 0.75 (NTSB, 2010). According to responders and damage assessors who worked on-scene monitoring and advising the response effort from its early stages, the spill presented unique challenges not typical in traditional crude oil spills (Jessica Winter personal communication, 2012; Laurie Muller personal communication, 2013). Because oil begins to weather as soon as it enters the environment, some of these unique challenges are a direct result of the specific environment in which the spill occurred. An additional difficulty is determining definitively what role the physical properties of Cold Lake Blend and Western Canadian Select played in the ultimate fate of the oil spilled. Responders from the EPA, NOAA, and the NTSB report state that containment and cleanup efforts required responding to floating, submerged and sunken oil (NTSB, 2010; Jessica Winter personal communication, 2012; Laurie Muller personal communication, 2013). Initially there was a visible sheen of oil on the water surface, and during the course of the cleanup, responders also found "blobs" of oil moving in the water column and sunken oil on the river bottom (Jessica Winter personal communication, 2012; Laurie Muller personal communication, 2013). Flood conditions, turbidity, and the velocity and volume of the river at the time of the spill all influenced the behavior of the oil once it was spilled (NTSB, 2010). Oil sands products could be particularly challenging in this type of dynamic fresh water environment because the lighter diluents evaporate, leaving the heavy ends of the product behind. If these heavy ends are sufficiently dense—and especially if they mix with sediment—the oil can become submerged or sunken.

Figure 3-1. Chart of heavy oil (yellow), extra heavy oil (orange) and bitumen (blue) based on viscosity vs. density.



Source: C.D. Cornelius, Classification of Natural Bitumen: A Physical and Chemical Approach, 1987

Conventional Crudes

March 25, 2014

Prepared for:
Alberta Innovates – Energy and Environment Solutions

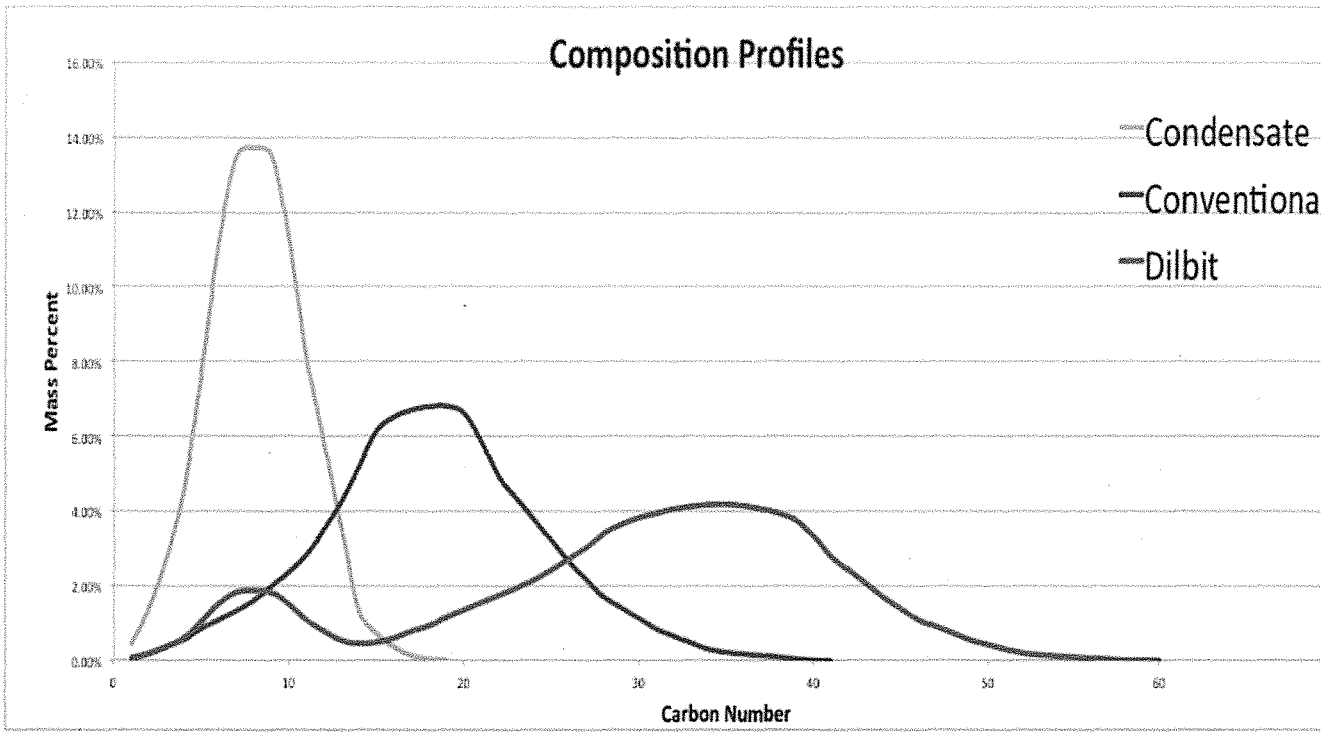


Figure 4 - Example of compositional profiles of condensate, conventional crude oil, and dilbit