

EXHIBIT B

ENVIRONMENTAL, HEALTH AND SAFETY IMPACTS
OF THE
PROPOSED
OAKLAND BULK AND OVERSIZED TERMINAL

Prepared
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by

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INTRODUCTION

The California Capital Investment Group (CCIG) has entered into a 60-year lease with the City of Oakland to redevelop the Oakland Army Base. As part of this larger project, located within the Port Authority Outer Harbor in Oakland in the West Gateway Complex, there is a proposed terminal called the Oakland Bulk and Oversize Terminal (OBOT or Terminal).¹ The leasable area consists of 12.45 acres of land area and 7.86 acres of wharf. CCIG currently has an exclusive option agreement with Terminal Logistics Solutions (TLS) to develop the OBOT.² Thus, CCIG is the long-term lease holder and TLS is the tenant of CCIG.

The only publicly available design information on this Terminal is a July 15, 2015 Basis of Design (BOD) report (7/16/15 BOD)³ and a series of “DRAFT” “conceptual drawings” showing the possible layout for a two commodity bulk terminal.⁴ The information in these sources could change significantly as design proceeds, as funding is firmed up for the project, and during acquisition of the many permits that will be required. My comments in this report are based on the 7/16/15 BOD, conceptual drawings, and various news reports. Thus, they are subject to revision as the Terminal design is finalized. My conclusions reached in this report from reviewing this material are as follows:

- **Terminal Design:** The recently posted Basis of Design plans are conceptual, meaning they can change at any time. More specific plans will be needed to obtain permits such as air quality permits from BAAQMD. There are no enforceable conditions requiring any of the potential controls outlined in these materials, e.g., covered rail cars, enclosed storage piles and conveyors, etc.
- **Design Drawings:** The design drawings indicate that the material handling equipment – storage domes and sheds, conveyors, loaders, etc. -- will not be located in an enclosed structure. Thus, there will be emissions of PM, PM10, and PM2.5 from all of the material handling equipment. Without more specific plans, it is not possible to quantify emissions.
- **Water Usage and Pollution:** This project will be a major user of California’s scarce water if it handles coal or other dusty material. Water is required to control dust during rail car unloading, at storage piles within enclosures, at drop points, and during ship loading. Based on experience at other terminals, and assuming throughput of 9.9 million tons per year of coal, 79.2 million gallons of water would be required every year to control dust. Per capita water use in Oakland is only 71.7 gallons per person per day.

¹ <http://www.oaklandglobal.com/index.php/project/about/project-overview>.

² See FAQ, <http://tlsoakland.com/faq/>.

³ FDR, Basis of Design, Oakland Bulk and Oversized Terminal, California Capital Investment Group, Preliminary Engineering, July 16, 2015, <http://tlsoakland.com/pdf/4.pdf>.

⁴ Conceptual Drawings, <http://tlsoakland.com/pdf/19.pdf>.

Thus, the water required to control dust at the proposed Terminal could supply over 3,000 Oakland residents every year. In the middle of a record-setting state drought, which exporting and burning coal will further exacerbate, this is not an appropriate use of Oakland's limited water supply. Further, the design plans have no information on how wastewater containing coal dust will be disposed. If discharged into San Francisco Bay, it could have many detrimental impacts on water quality and aquatic organisms.

- **Coal Dust:** As CCIG's⁵ and TLS's⁶ recent submissions seem to indicate, the coal rail cars will most likely be uncovered. The coal loss from an uncovered bottom unloading car during a typical 400 mile trip is 45 lb from the bottom and 600 lb from the top, for a total of 645 lb per car.⁷ Up to 3% of the coal loaded into a coal car can be lost in transit, which for a coal car carrying 121 tons would be 3.63 tons/car or more than 7000 lbs/car. Assuming 3 trains/day, up to 68,500 tons/yr of coal dust could be emitted from trains carrying coal from Utah to the Terminal. Assuming entry at Donner Pass, the shortest route, at least 200 miles of this route are in California. Thus, about 27% of the coal dust or about 18,300 tons/yr could be released within the state in communities like Sacramento, Davis, Richmond, Berkeley, Emeryville, and Oakland. Coal dust includes fine particles, both PM10 and PM2.5,⁸ which are directly linked to health problems, including premature death, heart attacks, asthma and other problems. Coal dust can also contaminate air, water and soil, and adjacent homes, schools, and other buildings.
- **Diesel Particulate Matter:** The unit trains importing coal will be powered by up to five locomotives, which emit diesel particulate matter, a potent carcinogen that will pose significant public health risks in communities along the rail lines and adjacent to the Terminal.
- **Traffic, Noise, Vibration, Visual Impact:** The unit trains importing coal and the Terminal itself would also result in significant traffic, noise, and vibration impacts.
- **Mitigation:** None of the impacts that I discuss in this report were anticipated in the CEQA review of this Project. Further, none of the mitigation measures attached in the Sept. 8, 2015 Stice & Block Letter from the project's CEQA review⁹ would address these impacts. Rail car coal dust, for example, is not regulated by any of the permits that the Terminal must obtain.

⁵ Letter from David C. Smith, Stice & Block, LLP, to Sabrina Landreth, City of Oakland, Re: September 21, 2015, Oakland City Council Public Hearing, September 8, 2015 plus attachments (Sept. 8, 2015 Stice & Block Letter).

⁶ Edward J. Liebsch and Michael Musso, HDR Engineering, Oakland Bulk and Oversized Terminal Air Quality & Human Health and Safety Assessment of Potential Coal Dust Emissions, September 2015 (Sept. 2015 HDR Report).

⁷ Minutes, Rail Energy Transportation Advisory Committee, September 10, 2009, <http://www.scribd.com/doc/129350651/Surface-TransMinutes-9-10-09-1>.

⁸ Daniel Jaffe and others, Diesel Particulate Matter and Coal Dust from Trains in the Columbia River Gorge, Washington State, USA, Accepted for publication in Atmospheric Pollution Research, April 23, 2015.

⁹ Sept. 8, 2015 Stice & Block, Ex. A.

My resume is included in Exhibit 1 to these comments. I have over 40 years of experience in the field of environmental engineering, including air emissions and air pollution control; greenhouse gas emission inventory and control; air quality management; water quality and water supply investigations; hazardous waste investigations; hazard investigations; risk of upset modeling; environmental permitting; nuisance investigations (odor, noise); environmental impact reports/statements, including California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documentation; risk assessments; and litigation support.

I have M.S. and Ph.D. degrees in environmental engineering from the University of California at Berkeley with minors in Hydrology and Mathematics. I am a licensed professional engineer (chemical, environmental) in five states, including California; a Board Certified Environmental Engineer, certified in Air Pollution Control by the American Academy of Environmental Engineers; and a Qualified Environmental Professional, certified by the Institute of Professional Environmental Practice.

FACILITY DESIGN

The design capacity of the Terminal is reported in the 7/16/15 BOD as 9.9 million tons/yr (MT/yr), with a stabilized throughput of 75% of design or 6.9 MT/yr for two commodities, designated Commodity A and B.¹⁰ Prior information posted on the applicant's website suggested a significantly higher throughput, 26.3 MT/yr.¹¹

The commodities will be shipped in Handymax, Panamax, and Capesize¹² vessels. No dredging is anticipated to accommodate these vessels, assuming the Capesize vessels are lightly loaded to 143,000 tons.¹³ The rail cars will have a net capacity of 121 tons and are described as "North American Covered Hopper Cars equipped with removable, fiberglass covers".¹⁴ The current design plans suggest that most conveyors will be enclosed, with the possible exception of pipe conveyors connecting the railcar dumper to storage. Commodity A will be stored in a series of longitudinal stockpiles located within a "storage building"¹⁵. Commodity B will be stored in top-filled, concrete storage domes vented to a dust collection system.

The design calls for trains of 104 railcars each (referred to as "unit trains" in this report) to import these commodities. The analysis below indicates that two to three unit trains of 104 railcars each, potentially all carrying coal, will visit the Terminal every day the Terminal is operating or 362 days per year, assuming the design throughput in the 7/16/15 BOD. However,

¹⁰ 7/16/15 BOD, p. 1, Sec.2.2.

¹¹ Oakland Global, Project, <http://www.oaklandglobal.com/index.php/project/about/project-overview> reports handling up to 12, 50-car trainloads per day. Assuming a net capacity of 121 tons per car (7/16/15 BOD, Table 9-1), this amounts to: 12 x 50 x 121 x 362 day/yr = 26,281,200 ton/yr.

¹² A capsize vessel is too large to fit through the Panama Canal and must sail around a cape.

¹³ 7/16/15 BOD, Table 8-1.

¹⁴ 7/16/15 BOD, Table 9-1.

¹⁵ Drawing BMH-142, Commodity A Storage Building Section.

if the throughput reported in the Project description of 26.3 million tons of coal per year is assumed, many more unit trains would visit the Terminal each day.

Commodity A

Commodity A is characterized as “very dusty, exhibits spontaneous combustion behavior, potentially explosive”.¹⁶ This description coupled with other information in the 7/16/15 BOD, Table 9-1, indicates that Commodity A is most likely coal. This is supported by investigative news reports and e-mail correspondence, identifying Utah coal as the likely source.¹⁷ Commodity A will be blended, suggesting coal from different mines or seams will be blended during loading at the Terminal to meet import requirements.

Commodity A railcars are expected to be bottom dump aluminum construction, closed-top hopper cars with a cargo capacity of about 121 tons.¹⁸ Thus, a train carrying Commodity A will carry 12,584 tons¹⁹. As 75% of the Terminal design throughput is designated for Commodity A, about 2 unit trains per day carrying coal will visit the Terminal.²⁰

Commodity B

Commodity B will have a design throughput of 1.7 MT/yr²¹ and is characterized as “very dusty, hygroscopic.”²² Hygroscopic materials absorb water from the air and include many materials including coal, as well as soda ash, cellulose fibers, many fertilizers, salts, and

¹⁶ 7/16/15 BOD, Table 9-1.

¹⁷ Project Could Transform Local Coal Market to International, The Richfield Reaper, April 7, 2015 (“The purchase of Sufco by Bowie [Resources] is what’s driving all of this,”...He said Bowie is interested in expanding its coal shipping capacity to international markets, which would make the coal industry in Utah viable over a longer period of time....By purchasing a portion of the port’s capacity, the four partner counties would be able to use 49 percent of an estimated 750,000 tons of shipping capacity each year to ship coal and other products.”), http://www.richfieldreaper.com/news/local/article_e13121f0-dd67-11e4-b956-3ff480cc1929.html; Darwin BondGraham, Banking on Coal in Oakland, East Bay Express, August 19, 2015, <http://www.eastbayexpress.com/oakland/banking-on-coal-in-oakland/Content?oid=4463888>; Utah Wants to Send Trainloads of Coal to California Ports, AllGov California, <http://www.allgov.com/usa/ca/news/california-and-the-nation/utah-wants-to-send-trainloads-of-coal-to-california-ports-150428?news=856347>; Brian Maffley, Utah Coal: California, Here It Comes – And Not Everyone is Happy, August 14, 2015, The Salt Lake Tribune, <http://www.sltrib.com/home/2425141-155/utah-coal-california-here-it-comes>; Doug Oakley, Unlikely Partners: Utah Investing \$53 Million to Export Coal through Oakland Port, San Jose Mercury News, April 24, 2015; Confidential Communications: (1) cjarrett02@gmail.com to Brody & Amber Keisel, April 8, 2015 (“...the script was to downplay coal, and discuss bulk products and a bulk terminal...); (2) Brody Keisel to Steve Frischknect, April 8, 2015, attaching CIB Presentation; (3) Jeff Holt to Jae Potter, April 24, 2015.

¹⁸ 7/16/15 BOD, p. 12, Sec. 12.1.1.

¹⁹ Amount of coal carried per train: 104 rail cars x 121 tons/car = 12,584 tons/train.

²⁰ The maximum number of unit trains carrying Commodity A per day = $0.75(9.92 \times 10^6 \text{ ton/yr}) / 12,584 \text{ ton/train} = 591 \text{ unit trains/yr}$. As the Terminal will operate 362 days/yr (7/16/15 BOD, p. 5), this means that on average, $591/362 = 1.6$ unit trains per day or up to 2 unit trains carrying Commodity A will visit the Terminal every day the Terminal is operating.

²¹ 7/16/15 BOD, Table 6-1.

²² 7/16/15 BOD, Table 9-1.

limestone. Commodity B railcars are expected to be steel construction, closed top, bottom dump hopper cars, with a cargo capacity of about 99 tons.²³ A train carrying Commodity B will import 10,296 tons per unit train²⁴. Commodity B will not be blended. As 25% of the Terminal design throughput is designated for Commodity B, about one unit train per day on 241 days will carry this unidentified material to the Terminal.²⁵

While two separate materials are identified, the design of the facility and the lack of any enforceable conditions would allow 100% of the throughput to be coal.

Dust Control

The BOD indicates the facility will use Best Control Technology (BCT) to control emissions. Public relations information²⁶ indicates all commodities handed at the Terminal will be:

- transported from origin to the Terminal in specially designed covered rail cars;
- discharged from the covered rail cars into an enclosed underground unit with dust control/collection technology;
- moved within the Terminal in enclosed conveyance systems with dust control/collection technology;
- stored within enclosed dome storage unit(s) with dust control/collection technology; and
- loaded onto the vessels using enclosed state-of-the-art ship loaders with dust control/collection technology.

Commodity A will be stored in a series of covered longitudinal stockpiles and will be reclaimed using dozers. Dust will be controlled by dry fog and/or water spray at the covered railcar dumper building, covered bulk material storage buildings, enclosed transfers, enclosed/covered conveyors, and dry fog and/or water spray at transfer points and stockpiles.

Commodity B will be stored in two concrete storage domes equipped with a dust control system and reclaimed by gravity onto a series of reclaim conveyors in above-ground tunnels underneath the domes. Dust will be controlled using the following:

²³ The 7/16/15 BOD, Table 9-1 indicates a net capacity of 121 tons for railcars importing both Commodities A and B.

²⁴ Amount of Commodity B carried per unit train: 104 cars/train x 99 ton/car = 10,296 tons/unit train.

²⁵ Maximum number of unit trains carrying Commodity B per day = $0.25(9.92 \times 10^6 \text{ ton/yr}) / 10,296 \text{ ton/train} = 241$ unit trains/yr. As the Terminal will operate 362 days/yr (7/16/15 BOD, p. 5), this means that one unit train carrying Commodity A will visit the Terminal on 241 days.

²⁶ TLS, FAQ: Frequently Asked Questions, <http://tlsoakland.com/faq/>.

- cartridge style, pulse-jet dust collectors or bin vents
- unloading boots, enclosed hopper and dust collection at the covered railcar dumper building
- enclosed storage domes with dust collection
- enclosed conveyor transfers
- covered conveyors
- dust collection at transfer point and shiploader (only “as required”)
- dust collectors will include rotary air lock.

The design drawings indicate that the material handling equipment – storage domes and sheds, conveyors, loaders, etc. will not be located in an enclosed structure.²⁷ Thus, there will be emissions of PM, PM10, and PM2.5 from all of the above identified equipment.

ENVIRONMENTAL IMPACTS

The environmental impacts cannot be fully determined based on the available information, reviewed above. However, a similar proposal to export coal from the Port of Oakland was rejected by the Port of Oakland in connection with the proposed Howard Terminal. The issues identified by the Port of Oakland are outlined in a staff report that found significant environmental issues associated with handling export coal.²⁸ These impacts included:

At the Terminal:

- Fugitive coal dust and local air quality, requiring storage domes; enclosed conveyors and ship-loader systems;
- Risk of explosions;
- Impact of train length, up to 1.5 miles, on rail crossing in densely populated areas along route;
- Berth dredging to accommodate larger and more heavily laden vessels;
- Visual impacts of storage domes and other structures;
- Noise and vibrations from loading, unloading, and conveyor system;
- Construction impacts;
- Diesel particulate matter from train and ship engines;
- Greenhouse Gas (GHG) emissions from shipping coal from Utah to Oakland and Oakland to Asia.

²⁷ Conceptual Drawings, <http://tlsoakland.com/pdf/19.pdf>.

²⁸ Port of Oakland Memo from Anne Whittington to Richard Sinkoff, Re: Environmental Issues Associated with Handling Export Coal, February 19, 2014.

Transport from Mine Source to Terminal:

- The loss of up to 12 tons of coal dust, assuming control using surfactants;
- Impacts of train lengths of up to 1.5 miles on rail crossing and noise from train safety horns and rail crossing barriers in communities along the rail line (Completely covering the rail cars could eliminate the dust.)

Coal Consumption in Asia:

- Inconsistent with California climate change policy
- Inconsistent with California Joint Resolution 35, Chapter 139²⁹
- Inconsistent with goal to promote cleaner domestic energy source
- Potential to increase acid rain and mercury deposition in the Pacific Ocean and Western U.S. from Asia due to wind patterns

All of these issues apply to the current proposal with the possible exception of the need to dredge. In addition, the proposed Terminal presents the following additional issues not addressed in the Howard Terminal analysis:

- Water use for dust control
- Seismic-induced liquefaction and lateral spreading hazards due to site-specific soil conditions
- Impacts of coal spills on California's water supply
- Covered rail car issues
- Ignitability and spontaneous combustion
- Visual impacts of huge storage domes
- Impact of increase in rail and ship traffic on other operators within the Port of Oakland and elsewhere in San Francisco Bay

Some of these issues are discussed below.

Water Use

The major coal handling operations at the Terminal are enclosed. However, water is still required to control dust during unloading,³⁰ at storage piles within enclosures, at drop points, and during ship loading. Based on experience at other terminals, about 8 gallons of water are required per ton of coal throughput to control dust.³¹ Assuming 100% of the Terminal's design throughput of 9.9 million tons per year is coal or another similarly dusty material, 79.2 million

²⁹ California Legislative Information, Assembly Joint Resolution No. 35, Chapter 139, Relative to Exportation of Coal, Approved by Governor, September 18, 2012, Filed with Secretary of State, September 18, 2012.

³⁰ See the significant amount of water used for coal unloading in the video, Unloading Coal via Rotary Dump, proposed for the Terminal, at: <http://www.coalcap.com/press.asp>.

³¹ George D. Emmitt, Minimizing Groundwater Consumption for Required Fugitive Dust Control Programs, <http://www.powerpastcoal.org/wp-content/uploads/2011/08/MINIMIZING-GROUNDWATER-CONSUMPTION-FOR-REQUIRED-FUGITIVE-DUST-CONTROL-PROGRAMS.pdf>.

gallons of water would be required every year to control dust. In comparison, per capita water use in the area where the Terminal will be located is 71.7 gallons per person per day.³² Thus, the water required to control dust at the proposed Terminal could supply over 3,000 Oakland residents every year.

California is currently experiencing a record-setting drought that started in 2012 and recently culminated in the first ever mandatory state-wide water restrictions. The April 2015 snow water equivalent was at only 5% of its historical average.³³ The snowpack is the major source of California's water supply, filling its reservoirs as temperatures warm and the snow melts. The record low snowpack coincides with record high January to March temperatures, highlighting the modulating role of temperature extremes in California drought severity. These results foreshadow major future impacts of climate change on the state's water supply. Further, the export of this coal will contribute to global warming and thus aggravate California's water supply situation. Therefore, the use of the state's severely depleted water supply, which is likely to remain so in the future, at a coal terminal that will aggravate the water supply deficit and contribute to global warming, is not a reasonable beneficial use of the State's limited water supply.

Wastewater Disposal

The 79.2 million gallons of water used each year to control dust will be highly contaminated with coal particles and other materials. The documents that I have reviewed identify only "process water collection and treatment facilities" but don't disclose whether "process water" is dust control wastewater nor what type of treatment would be used.³⁴ Conceptual drawing GC-100 identifies a "washdown treatment vault" with discharge to the Bay. These terms, "process water" and "washdown water", are ambiguous and have no special meaning. If the dust control wastewater is discharged into the Bay, it would result in significant biological impacts due to high amounts of suspended coal particles.

Accidents

The trains carrying Utah coal to the Terminal would most likely enter California in the northern part of the State, traveling via the Feather River Canyon or Donner Pass to the Bay

³² SWRCB, July 2015 Water Conservation Report by Supplier, Excel Spreadsheet: October 2014 – April 2015 Urban Water Supplier Report, http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.shtml.

³³ S. Belmecheri et al., Multi-century Evaluation of Sierra Nevada Snowpack, Correspondence, Nature Climate Change, Advance Online Publication, September 14, 2015, http://www.nature.com/articles/nclimate2809.epdf?referrer_access_token=O7tjNvIGP2FXqNF-SJoodRgN0jAjWel9jnR3ZoTv0MaTV2Rp6vP_EsijdwLJ1-6EMR-RFne5yHuc6YcKNVdCtzoYQ7rj7-QHAuGoydFDdl1GZvEKF_67x11s32_i8IPfhF0DEEuVeX5gAS68cB5EzrRSO82GCWkqLz34Tmpos7K6rK_mAzmIsrJg7fm6zadxUJGEjxWuUWxeWbRCNrCqvXZGoKMz5WRE6T8-shfV6Iw2TQViyHAL47SGFeDXq6ddr11KKQLA8Ohmsd4Z95MNwb4qEhsDB903Y4RdbzuGEulOtUpQO0HL41qQaVQp70IzN0AWUuIa5VJDXrPna5LIUUyusya39rwBp72INck_zfHqyaN14_6HG4oPUNFZKu&tracking_referer=www.nytimes.com.

³⁴ 7/16/15 BOD, p. 4.

Area.³⁵ Thus, they will travel through some of the state's most densely populated areas, as well as some of its most sensitive ecological areas, as rail lines frequently operate near or over rivers and other sensitive waterways in the state.

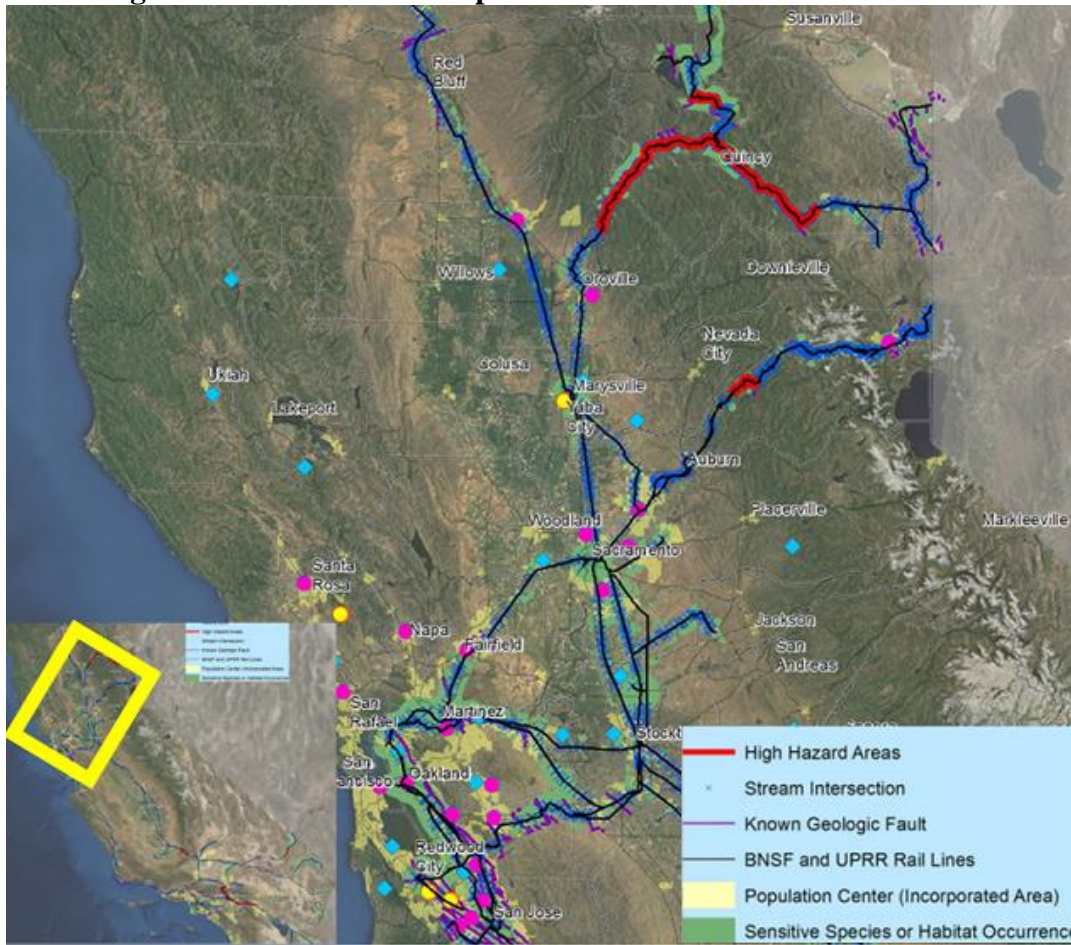
The two most likely routes include numerous "high hazard areas" where accidents are likely due to poor track and infrastructure conditions, e.g., steep grades, poor track condition, bridges in poor condition.³⁶ See red segments on Figure 1. An accident in these areas could result in a major release of coal into the State's water supply, which would be very difficult to cleanup due to the nature of coal. This could shut down the water supply for much of the state, resulting in significant statewide impacts on agricultural and municipal water supplies as well as significant aquatic biological impacts. A recent derailment in this area, involving corn, rang alarm bells as to the consequences if a more hazardous substance, such as coal, were involved.³⁷

³⁵ See map of U.S. Major Freight Rail Lines at: http://earthjustice.org/features/map-crude-by-rail?utm_source=crm&utm_content=image&curation=ebrief. See also: Cambridge Systematics, Inc., National Rail Freight Infrastructure Capacity and Investment Study, September 2007, Figure 4.1, http://www.camsys.com/pubs/AAR_Nat_%20Rail_Cap_Study.pdf.

³⁶ Interagency Rail Safety Working Group, State of California, Oil by Rail Safety in California. Preliminary Findings and Recommendations, June 10, 2014.

³⁷ Tony Bizjak, Feather River Train Derailment Raises New Concerns, Sacramento Bee, December 6, 2014, <http://www.sacbee.com/news/local/transportation/article4315150.html>. See also: <http://www.abc10.com/story/news/local/california/2014/11/26/train-derailment-feather-river-canyon/70133634/>.

Figure 1. Rail Hazards Map



Further, the coal trains themselves could increase the probability of an accident by increasing the load on the tracks and by depositing coal dust on the tracks and in the track ballast, which are well known causes of train accidents. Coal trains weigh much more than other types of trains travelling these routes. The unit trains proposed to call at the Terminal loaded with coal, for example, weigh 15,600 tons³⁸ compared to 5,000 tons per train for double stack container trains, 8,500 tons for manifest trains, and 10,000 tons for grain trains.³⁹ The extra weight from these coal-carrying trains would pose additional stresses on the tracks, increasing the probability of accidents.

Further, unit trains have recently started importing crude oil to Bay Area refineries, using these same routes. A significant future increase in these crude trains is anticipated. The cumulative increase in unit crude oil and coal trains is a potentially deadly combination,

³⁸ Weight of 104 car unit train carrying coal: (104 cars)(130 tonne/car)(1.1 ton/tonne) + (5 locomotives)(150 ton/locomotive) = **15,622 tons.**

³⁹ Railway Capacity Background & Overview, <http://www.quorumcorp.net/Downloads/Papers/RailwayCapacityOverview.pdf>.

increasing derailment risk for both coal and oil trains.⁴⁰ Oil train derailments can decimate entire communities. The blast zones—within one mile of the rail tracks—for oil trains disproportionately impact environmental justice neighborhoods, communities with racial minorities, low incomes, or non-English speaking households.⁴¹

Coal Dust

Coal dust from both trains and the Terminal is notoriously difficult to control and results in numerous significant environmental impacts. The 7/16/15 BOD asserts that product will arrive at the Terminal in “North American Covered Hopper Cars”, equipped with removable, fiberglass covers,⁴² suggesting coal dust from the unit trains will be controlled. However, there is no enforceable condition to require that the rail cars be covered and shippers have historically resisted covering due to cost. The City and other permit-issuing agencies, such as the Bay Area Air Quality Management District, are likely preempted by federal law from regulating coal cars along the rail lines,⁴³ outside of the Terminal. Thus, the Terminal operator and the shippers can import coal in uncovered cars, regardless of assertions in the 7/16/15 BOD or elsewhere. The most recent Sept. 2015 HDR report prepared for California Capital Investment Group also analyzes uncovered coal cars.

Transporting coal in uncovered cars is standard industry practice to cut costs. Thus, most coal cars are uncovered. Covered rail cars have historically been used to transport bulk commodities such as grain, cement, fertilizers, food and sand, but not coal. While many companies are working on cover designs for coal cars, my research to date has not identified a commercial source for covered coal rail cars. Several companies have developed prototypes, but none are in commercial production. As there are no enforceable conditions requiring that the cars be covered, the applicant and Terminal users have no obligation to use covered rail cars. Thus, it is reasonable to assume that the rail cars servicing the Terminal will be uncovered. Therefore, I discuss some of the issues that will arise if the cars are not covered followed by a discussion of issues with covered cars, should they be used.

Coal dust can result in significant environmental impacts for two principal reasons. First, in California (and many other states), the rail lines parallel waterways. As shown in Figure 1, the two most likely rail routes to Oakland follow rivers and pass through the Sacramento-San Joaquin Delta, the largest and most biologically important estuary on the Pacific coast. These waterways also supply a significant fraction of California’s water supply. Coal dust falling

⁴⁰ See e.g., Daily Oil Trains Could Threaten Lives in the Bay Area, SF Chronicle, August 10, 2015, <http://blog.sfgate.com/hottopics/2015/08/10/daily-oil-trains-could-threaten-lives-in-the-bay-area/>.

⁴¹ Crude Injustice on the Rails, Communities for a Better Environment, June 30, 2015, <http://www.cbecal.org/media/cbe-updates/crude-injustice-on-the-rails-report-calls-out-environmental-racism/>.

⁴² 7/16/15 BOD, Table 9-1.

⁴³ Tovah R. Trimming, Derailing Powder River Basin Coal Exports: Legal Mechanisms to Regulate Fugitive Coal Dust from Rail Transportation, Golden Gate University Environmental Law Journal, v. 6, issue 2, June 21, 2013, <http://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1104&context=gguelj>. See also memo to CCIG from Venable, LLP, September 8, 2015 (arguing City of Oakland cannot regulate rail.)

along the tracks in these areas would be blown into or washed into the waterways by rainfall runoff. Second, there is a long history of coal dust creating nuisance conditions for those living and working adjacent to the tracks.

Uncovered Rail Cars

Uncovered rail cars carrying coal emit significant amounts of coal dust.⁴⁴ Most coal dust is emitted from the top of the rail car, but some is also emitted from the bottom. The movement of cars during transit creates vibrations that break larger pieces of coal into smaller particles, creating a continuous source of dust as the trains travel to their destination. Dusting also occurs on the empty return trip as leftover coal particles are blown out of the cars. This dust would be deposited along and adjacent to the rail lines between Utah and the Terminal as well as at the Terminal while waiting to be unloaded. Coal dust losses vary with wind speed, train speed, time of year, load shape, and topping agents.

While the 7/16/15 BOD asserts that covered rail cars will be used, this claim is unenforceable, the applicant has failed to identify a source of coal car covers, and there is no history of their use for transporting coal due to added cost and safety issues, discussed elsewhere. The September 2015 HDR report asserts that coal dust can be reduced by at least 85% using topping agents (surfactants) and load profiling/packing. However, these have not been proposed by the applicant and are also unenforceable.

A representative of BNSF testified before the Rail Energy Transportation Advisory Committee (RETAC) that coal loss from an uncovered bottom unloading car during a typical 400 mile trip is on average 45 lb from the bottom and 600 lb from the top, for a total of 645 lb per car.⁴⁵ Elsewhere, BNSF has reported that “The amount of coal dust that escapes from PRB coal trains is surprisingly large...BNSF has done studies indicating that from 500 lbs to a ton of coal can escape from a single loaded coal car. Other reports have indicated that as much as 3% of the coal loaded into a coal car can be lost in transit.” BNSF has pulled this information from its website, but it was captured and duplicated elsewhere.⁴⁶ Norfolk Southern reported similar losses, up to 1,200 lb/car and typically 400 to 800 lb/car along a 500 mile rail corridor hauling a bituminous coals similar to the Utah coals.⁴⁷

The rail distance from central Utah where the coal would be mined to the Terminal is about 750 miles. Assuming three 104-car unit trains per day, up to 68,300 tons/yr of coal dust

⁴⁴ See dust from typical coal unit train at: <https://www.youtube.com/watch?v=RzD2olpao0Q>.

⁴⁵ Minutes, Rail Energy Transportation Advisory Committee, September 10, 2009, <http://www.scribd.com/doc/129350651/Surface-TransMinutes-9-10-09-1>.

⁴⁶ Cassandra Profita, How Much Coal Dust Will There Really Be?, July 30, 2012, <http://www.opb.org/news/blog/ecotrope/10753/>.

⁴⁷ Edward M. Calvin, G.D. Emmitt, and Jerome E. Williams, A Rail Emission Study: Fugitive Coal Dust Assessment and Mitigation, <http://www.powerpastcoal.org/wp-content/uploads/2011/08/A-RAIL-EMISSION-STUDY-FUGITIVE-COAL-DUST-ASSESSMENT-AND-MITIGATION.pdf>.

could be emitted from trains servicing the Terminal.⁴⁸ Assuming entry at Donner Pass, the shortest route, at least 200 miles of this route are in California. Thus, about 27% of the coal dust or about 18,200 tons/yr could be released within the state. While much of this dust would be deposited near the tracks, which are adjacent to rivers and estuaries, a significant amount of the coal dust would become air borne and cause significant downwind air quality, public health, and ecosystem impacts.⁴⁹

Some have claimed—including the recent Sept. 2015 HDR report submitted by CCIG at p. 5—that most of this coal dust is deposited close to the mine. However, numerous YouTube and other videos⁵⁰ and Seattle Times photos in the Columbia River Gorge debunk this claim. See Figure 2. Dust is generated throughout the trip by movement of the cars during transit, particularly over the mountainous terrain between the mines in central Utah and Oakland, e.g., they must cross the Sierra Nevada mountains, which will require numerous speed changes as the trains negotiate challenging mountain passes, steep grades, and sharp curves. The references to behavior of wind blown dust from stationary storage piles in the Sept. 2015 HDR report at 5 are irrelevant to train travel. The problems caused by released coal dust are detailed below.

Figure 2. Photograph of Unit Coal Train Passing Through Columbia River Gorge.



First, railroads in California (and elsewhere, see Figure 2) parallel or cross many rivers and estuaries (Figure 1), which contain sensitive species and are lined with riparian corridors.

⁴⁸ Coal dust: Assuming 645 lb/car x (750 mi/400 mi) x 104 cars/train x 3 trains/day x 362 day/yr/2000 lb/ton = **68,296 lbs.**

⁴⁹ See reviews in: Dan Ferber, Research Finds Additional Harm from Coal Dust Exposure, February 20, 2013, <http://midwestenergynews.com/2013/02/20/research-finds-additional-harm-from-coal-dust-exposure/> and Eric de Place, How Coal Affects Water Quality: State of the Science, March 20, 2013, <http://daily.sightline.org/2013/03/20/how-unburnt-coal-affects-water-the-state-of-the-science/>.

⁵⁰ See the videos at Coal Dust: Norfolk Southern's Most Insidious Gift to Its Own Hometown, <http://coaldustnorfolk.com/NSCoalHandling.html>.

Thus, some of the 68,300 tons/yr of coal dust released during transit from Utah could end up in riparian zones and waterways, resulting in significant ecological impacts.

Coal dust that reaches waters adjacent to rail lines – such as the American, Feather, Yuba, and Sacramento Rivers and the Sacramento-San Joaquin Delta -- will have adverse physical effects on exposed organisms including abrasion, smothering, reduction in availability of light and clogging of respiratory and feeding organs.⁵¹ Young salmon and trout exposed to coal washings, for example, experienced 100% mortality after 0.5 to 2.5 hrs exposure. The dead fish had heavy secretions of mucus from the skin and gills, to which particles of coal adhered.⁵² In another study, exposure of juvenile chinook salmon to coal dust resulted in metabolic activation of genes that convert PAHs to carcinogenic and mutagenic metabolites. Coal dust leachates also reduce the growth rate of trout, cause oocyte atresia and reduce ovarian growth in crayfish, and promote DNA adduct formation and hepatocellular carcinoma in fish.⁵³

Second, coal dust destabilizes rail bed ballast, which underlies and stabilizes tracks and has led to accidents, high cleanup costs, and litigation to require shippers of coal from the Powder River Basin to use surfactants to reduce coal dust. BNSF spent more than \$100 million cleaning and replacing track ballast in Wyoming in 2009 and 2010. These surfactant rules do not apply to coal shipped from Utah. Further, the dust also deposits on the tracks, causing derailments.⁵⁴

Third, coal dust, blown from unit trains, the Terminal, and staged rail cars at the Terminal, can have many impacts on humans, animals, and plants along the rail lines and in adjacent communities. The coal dust blown or otherwise emitted from these sources consists mainly of fine black particles that are carried by winds onto properties adjoining the Terminal and rail tracks. The most intense dusting events occur when trains travelling in opposite directions meet at normal track speeds,⁵⁵ which will be common occurrences due to operation of the Terminal. In addition, tunnels, trestles, and open field often cause emissions due to lateral wind stresses.⁵⁶

⁵¹ Michael J. Ahrens and Donald J. Morrissey, Biological Effects of Unburnt Coal in the Marine Environment, *Oceanography and Marine Biology: An Annual Review*, v. 43, pp. 69-122, 2005.

⁵² C.F. Pautzke, Studies on the Effect of Coal Washings on Steelhead and Cutthroat Trout, *Transactions of the American Fisheries Society*, v. 67, pp. 232-233, 1937.

⁵³ P.M. Campbell and R.H. Devlin, Increased CYP1A1 and Ribosomal Protein L5 Gene Expression in a Teleost: The Response of Juvenile Chinook Salmon to Coal Dust Exposure, *Aquatic Toxicology*, v. 38, pp. 1-15, 1997.

⁵⁴ See, for example:

<http://www.stb.dot.gov/decisions/readingroom.nsf/fc695db5bc7ebe2c852572b80040c45f/3bdd891ff0ccc1fb8525794f006db7c9?OpenDocument>

and <http://www.stb.dot.gov/decisions/ReadingRoom.nsf/WEBUNID/79B5382AE20F7930852578480053111F?OpenDocument>.

⁵⁵ Simpson Weather Associates, Inc., Norfolk Southern Rail Emission Study, December 30, 1993, [http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD581994/\\$file/SD58_1994.pdf](http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD581994/$file/SD58_1994.pdf). See also video at: <https://www.youtube.com/watch?v=qVUJcmxZ7BE>.

⁵⁶ Report of the Joint Subcommittee Studying Ways to Reduce Emissions from Coal-Carrying Railroad Cars, Senate Document No. 23, Commonwealth of Virginia, 1997.

Farmers, landowners, and communities along the rail lines would have to deal with nuisance black grit covering their crops, lawns, homes, vehicles, and more seriously, increasing particulate matter in the ambient air, which would result in significant public health issues.⁵⁷ See coal dust videos.⁵⁸ Testimony before the Joint Subcommittee Studying Ways to Reduce Emissions from Coal-Carrying Railroad Cars” was summarized as follows:⁵⁹

“Homes and cars need repeated washing, windows and doors must stay closed and outdoor activity is curtailed because of the coal dust. Patio furniture and gardens are said to glisten with coal dust.

A so-called “blowout,” typically occurring during extreme meteorological conditions, can result in 40-foot-high clouds of dust billowing upward. Particularly bad episodes have reportedly forced some vehicles traveling along Route 29 to turn on headlights or pull off of the road. Homeowners have made claims with NS in exceptional cases to pay for the cleaning of their homes...[high winds are common in the Bay Area].

For those so affected, the constant presence of coal dust was characterized as a burden that diminishes their quality of life. The dust leaves a greasy black film wherever it lands, settling on windowsills and finding its way through cracks and crevices. Although documentation has not been available, some citizens exposed to emissions expressed concerns about the potentially harmful health effects of coal dust exposure.”

Similar complaints have been reported by communities in the Bay Area from coal trains that currently pass through Richmond on their way to the Levin Terminal. “In Parchester Village, a largely black and Latino neighborhood in northwestern Richmond, residents say coal dust blows off the open mounds, covering the grass and coating their screen doors...It’s everywhere, he says. If your truck sits here for two, three days without moving you can write your name on the front.”⁶⁰

[http://leg2.state.va.us/dls/h&sdocs.nsf/fc86c2b17a1cf388852570f9006f1299/0bef1dac9cc18b48852564420068dc18/\\$FILE/SD23_1997.pdf](http://leg2.state.va.us/dls/h&sdocs.nsf/fc86c2b17a1cf388852570f9006f1299/0bef1dac9cc18b48852564420068dc18/$FILE/SD23_1997.pdf).

⁵⁷ Paul R. Epstein and others, Full Cost Accounting for the Life Cycle of Coal, *Annals of the New York Academy of Sciences*, v. 1219, 2011, p. 84.

⁵⁸ See videos at: <https://www.youtube.com/watch?v=o4v5w-TuhWM>; <https://www.youtube.com/watch?v=6WdsrkyaGZI>; <https://www.youtube.com/watch?v=tFIXHT6KCRM>; <https://www.youtube.com/watch?v=gjnhhZ0mFb4>; <https://www.youtube.com/watch?v=LwuBhcfcoo>.

⁵⁹ Report of the Joint Subcommittee Studying Ways to Reduce Emissions from Coal-Carrying Railroad Cars, to the Governor and the General Assembly of Virginia, Senate Document No. 58, Commonwealth of Virginia, Richmond, 1995, [http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD581994/\\$file/SD58_1994.pdf](http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD581994/$file/SD58_1994.pdf).

⁶⁰ Julie Small, Coal Train Dust Worries Richmond Residents, KQED, June 22, 2015, <http://ww2.kqed.org/science/2015/06/22/coal-train-dust-worries-richmond-residents/>.

“Coal dust” is an umbrella term that includes the full range of particle classifications based on size, from granules to very small particles. Known health effects from coal dust exposure include skin damage, circulatory system problems, and increased risk of developing cancer. In one study, coal dust was associated with respiratory morbidity in school children. A cross section study found that respiratory symptoms were significantly more common in children in the areas exposed to coal dust than the control areas. Elevated symptoms included wheezing, excess cough, and school absences for respiratory symptoms.⁶¹ In another study, proximity to coal mining activities was associated with worse adjusted health status and with higher rates of cardiopulmonary disease, chronic obstructive pulmonary disease, hypertension, lung disease and kidney disease.⁶²

Coal dust includes fine particles, both PM10 and PM2.5.⁶³ These would be emitted from the coal trains along their entire route, from Utah to the Terminal in Oakland as well as from the Terminal itself. Coal dust would be released from staged rail cars waiting to be unloaded,⁶⁴ rail car unloading, coal conveying, blending, storing, and transferring coal to ships.

These pollutants are directly linked to health problems because they can travel deep into the lungs, some reaching the bloodstream. They thus affect both the lungs and heart. Numerous scientific studies have linked particle pollution to a variety of health problems, including premature death in people with pre-existing lung and heart disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms, such as irritation of airways, coughing, or difficulty breathing.⁶⁵ The Utah coals that will be imported have elevated levels of silica,⁶⁶ which is more toxic than coal and is regulated to 1/20th the level of coal dust in occupational settings. Exposure to coal dust with elevated silica can result in silicosis, pulmonary tuberculosis, and lung cancer.⁶⁷

Coal dust from uncovered rail cars also can result in other impacts, including soil contamination, visibility impairment, environmental damage, and aesthetic damage. A study adjacent to a coal terminal in Norfolk, Virginia found elevated arsenic associated with coal

⁶¹ Bernard Brabin and others, Respiratory Morbidity in Merseyside Schoolchildren Exposed to Coal Dust and Air Pollution, *Archives of Disease in Childhood*, v. 70, pp. 305-312, 1994.

⁶² M. Hendryx and M.M. Ahern, Relations Between Health Indicators and Residential Proximity to Coal Mining in West Virginia, *American Journal of Public Health*, v. 98, pp. 669-671, 2008.

⁶³ Daniel Jaffe and others, Diesel Particulate Matter and Coal Dust from Trains in the Columbia River Gorge, Washington State, USA, Accepted for publication in *Atmospheric Pollution Research*, April 23, 2015.

⁶⁴ Phyllis Fox, Fugitive Particulate Matter Emissions from Coal Train Staging at the Proposed Coyote Island Terminal, Final Report Prepared for Sierra Club, July 19, 2013.

⁶⁵ U. S. Environmental Protection Agency. Particulate Matter, Health, <http://www.epa.gov/pm/health.html>.

⁶⁶ Silica levels range from 58.4% to 61.4% at four Bowie mines that may supply the Terminal. Sept. 2015 HDR Report, p. 13, <http://bowieresources.com/skyline/>.

⁶⁷ Jay Colinet, Health Effects of Overexposure to Respirable Silica Dust, Silica Dust Control Workshop, September 28, 201, <http://www.cdc.gov/niosh/mining/UserFiles/workshops/silicaMNM2010/1-Colinet-HealthEffects.pdf>.

particles, 2 to 20 times higher than upper crustal levels and 5 times higher than background soil.⁶⁸

The Sept. 2015 HDR report at 14 argues that trace metals in Utah coal are not a concern. However, they base their argument on EPA residential soil screening levels, rather than California risk-based screening levels.⁶⁹ The California levels indicate that arsenic levels in Utah coal (1 – 8 mg/kg) are 14 to 114 times higher than the residential soil-screening level (0.07 mg/kg) and are also significantly higher than the commercial/industrial level (0.24 mg/kg).

Coal particles can be carried long distances, settling in lakes and streams, where they can increase acidity and change nutrient balances; deplete soil nutrients; damage sensitive forests and farm crops; and affect the diversity of ecosystems. A study in Oregon, for example, correlated coal dust deposition with significantly higher soil temperatures, decreased soil pH, increased moisture-holding properties, and elevated heavy metal concentrations. These changes were possibly responsible for the lower frequencies and diversity of lichen species in the impacted area.⁷⁰ Others have noted that coal dust significantly reduced carbon dioxide exchange of upper and lower leaf surfaces.

The Sept. 2015 HDR study at 13-15 attempts to set aside any worry about coal dust emissions from coal transport as “operations at OBOT will require an air permit through BAAQMD, one of the most stringent regulatory agencies in the U.S....” However, this is incorrect. The BAAQMD has no jurisdiction over emissions from rail transport or mobile sources in general. None of the permits required for the Terminal will limit coal dust emissions from trains. This is an unregulated source.

Covered Rail Cars

While covered rail cars sound like a good idea as they would prevent the release of coal dust, they pose a different set of issues. First, who would own or lease them, the railroads, the coal producers, or the company importing coal from abroad? The Terminal would have no control over whether the trains arrive covered or uncovered. Thus, the claim in the 7/16/15 BOD that the rail cars will be equipped with “removable, fiberglass covers”⁷¹ is meaningless. Further, while the proposed covers could control the dust from the top of the train, they would not control dust from the bottom of the train, which comprises 7% of the total. Further, covered coal cars would create other issues.

⁶⁸ William J. Bounds and Karen H. Johanneson, Arsenic Addition to Soils from Airborne Coal Dust Originating at a Major Coal Shipping Terminal, *Water Air Soil Pollution*, 185:195-207, 2007.

⁶⁹ Office of Environmental Health Hazard Assessment and California Environmental Protection Agency, Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January 2005, Table 5, <http://www.oehha.ca.gov/risk/pdf/screenreport010405.pdf>.

⁷⁰ Sherry Spencer, Effects of coal dust on species composition of mosses and lichens in an arid environment. *Journal of Arid Environments*, v. 49, issue 4, pp. 843-853, 2001. Abstract available at: <http://www.sciencedirect.com/science/article/pii/S014019630190816X>.

⁷¹ 7/16/15 BOD, Table 9-1.

First, coal is a highly combustible material, characterized in the 7/16/15 BOD as “very dusty, exhibits spontaneous combustion behavior, potentially explosive.”⁷² Containing this material in a limited space, beneath a cover, could facilitate spontaneous combustion, by trapping heat in the car. This could result in the delivery of rail cars at the Terminal partially on fire and emitting toxic gases.⁷³ In fact, it is well known that covered cars that are not properly ventilated are a safety hazard because they increase the risk of the coal spontaneously combusting.⁷⁴ Ventilated tops would reduce this risk, but shippers claim they are too expensive. Further, ventilated tops would allow the emission of some coal dust.

The proposal here is for unventilated fiberglass covers, which, if used, present significant safety and public health issues for those along the rail route and near the Terminal in West Oakland. Smoldering rail cars moving through the densely populated Bay Area and queued up at the Terminal present a significant public health risk to nearby businesses and residents as they would release toxic air pollutants.

Second, fiberglass covers can break, bend, blow off, and fall off. Given that train lines pass through residential and commercial areas, such as Fourth Street in Berkeley, these covers could cause serious damage to adjacent properties, pedestrians, and motor vehicles.⁷⁵

Traffic Impacts at Train Crossings

Unit coal trains will adversely impact traffic at at-grade rail crossings, or places where the railroad tracks cross a road.⁷⁶ There are 55 at-grade rail crossings between Benicia and the proposed Terminal. A 104-car unit train is about 1.3 miles long⁷⁷ and would travel at a rate of about 10 mi/hr in urban areas. Thus, it would take a unit train 9 minutes⁷⁸ to pass any given point. Further, a 1.3 mile long train would block multiple rail crossings simultaneously. This would occur up to six times per day for 362 days out of each year as two to three unit trains filled with coal and two to three empty unit trains would pass through each of these crossings. Thus, each crossing would be blocked for up to an hour, 362 days of the year.

⁷² 7/16/15 BOD, Table 5-1.

⁷³ Coal’s Spontaneous Combustion Problem, Sightline Daily, April 11, 2012, <http://daily.sightline.org/2012/04/11/coals-spontaneous-combustion-problem/>.

⁷⁴ Nick Gier, Coal Trains Threaten Environment and Public Health, <http://www.sustainablepalouse.org/docs/CoalTrains2923.pdf>.

⁷⁵ See, for example, Metal Covers Blow off Freight Train, Lompoc Record, July 2, 2006, http://lompocrecord.com/news/local/metal-covers-blown-off-freight-train/article_3ddb578f-5262-595f-8dd5-f439e36d61ef.html.

⁷⁶ See, for example, “The bane of all drivers in Seattle’s SODO neighborhood: train crossings”, <http://www.seattlepi.com/local/transportation/article/Getting-There-How-long-can-trains-legally-block-1403713.php>.

⁷⁷ The proposed trains would have 104 cars. This would require up to 5 locomotives. A locomotive is about 80 ft long and a typical hopper car about 60 ft long. Thus, a 104-car unit train would be: $(5 \times 80) + (104 \times 60) = 6,640$ ft or about 1.3 miles long, ignoring the gaps between cars.

⁷⁸ Transit time = 1.3 miles/10 mi/hr x 60 min/hr + 1 min (open and close gates) = 8.8 minutes.

This long transit time blocking numerous sequential rail crossings simultaneously would create significant traffic jams during rush hours. It would also delay emergency medical response times, significantly impeding emergency vehicles, such as ambulances and fire trucks, creating public emergencies. Finally, it would increase the probability of train-vehicle collisions at grade crossings.

Air Emissions

The unit trains carrying coal to the Terminal will be powered by up to five diesel-fueled locomotives that emit diesel particulate matter (DPM) as well as criteria air pollutants (NO_x, SO₂, PM₁₀, PM_{2.5}, CO) along rail lines and while idling at the Terminal.⁷⁹ Further, ships and supporting tugs that export the coal, and diesel-fired equipment within the Terminal all emit DPM as well as criteria air pollutants. As coal trains weigh much more than other types of trains carrying different products, emissions from exporting coal would be proportionally higher from coal trains than from other types of trains because more locomotives would be needed to carry the extra weight. As noted elsewhere in this report, the unit trains proposed to call at the Terminal loaded with coal weigh much more than other types of trains using these rail lines.

Increased emissions of diesel particulate matter would likely result in significant health impacts in exposed populations along the rail lines and in the vicinity of the Terminal. Exposure to DPM has been linked with acute short-term symptoms such as headache, dizziness, light-headedness, nausea, coughing, difficult or labored breathing, tightness of chest, and irritation of the eyes, nose and throat. Long-term exposures can result in cardiovascular disease, cardiopulmonary disease, increased probability of heart attacks, lung cancer, worsening of asthma, and infant mortality. Children, teens and the elderly are especially vulnerable.⁸⁰

Health risk assessments of rail terminals and ports have found significant cancer risks from DPM up to 2 miles from the facilities. A health risk assessment prepared by the Spokane Regional Clean Air Agency found significant cancer risk (>10 cases in one million exposed) from DPM up to 2 miles from the BNSF Railyard.⁸¹ A health risk assessment of the BNSF Stockton Railyard reported cancer risks from DPM at 100 in a million within 300 yards of the railyard, at 50 in a million within one half mile, at 25 to 50 in a million within 1 mile, and at 10 in a million at up to 2 miles from the railyard.⁸² Similar cancer risk levels have been reported at railyards and terminals throughout the state⁸³ and would be expected in the vicinity of the Terminal, resulting in significant cancer risks in West Oakland.

⁷⁹ Jaffe et al. 2015; Daniel A. Jaffe et al., Diesel Particulate Matter Emission Factors and Air Quality Implications from In-Service Rail in Washington State, USA, Atmospheric Pollution Research, v. 5, pp. 344-351, 2014.

⁸⁰ OEHHA, Health Effects of Diesel Exhaust, http://oehha.ca.gov/public_info/facts/pdf/diesel4-02.pdf.

⁸¹ Spokane Regional Clean Air Agency, Health Risk Study for the Burlington Northern/Santa Fe Railroad Spokane Railyard, September 6, 2011, <https://www.spokanecleanair.org/documents/air%20quality%20monitoring%20reports%20studies/BNSF%20Spokane%20Railyard%20Health%20Study.pdf>.

⁸² California Air Resources Board (CARB), Health Risk Assessment for BNSF Railway Stockton Railyard, November 19, 2007, http://www.arb.ca.gov/railyard/hra/bnsf_stockton_hra.pdf.

⁸³ See, e.g., Port of Long Beach Pier S Redevelopment Project (<http://www.polb.com/civica/filebank/blobload.asp?BlobID=8735>); Port of Los Angeles San Pedro Waterfront

Noise

The equipment in the Terminal – ship loaders, switching locomotives, stackers, conveyors, reclaimers, railcar dumpers, ship loaders, dozers, etc. -- are major sources of noise that will be audible in adjacent West Oakland communities and will cause significant noise and vibration impacts.

Further, the unit trains that service the Terminal are major sources of noise that will adversely affect communities along the rail lines and adjacent to the Terminal. The noise from trains is legendary. In Berkeley where I live, train noise can be heard throughout the city, from Fourth Street near the tracks into the Berkeley Hills, 5 miles distant.

While there are many sources of noise from trains (high-pitch screeching, rumbling, idling engines, moving cars, etc.), horn sounding is the most significant. Federal rules governing the blowing of locomotive engine horns require that engineers of all trains sound horns for at least 15-20 seconds at 96-110 decibels (dB) at all public crossings. Decibels in the range of 80-105 are extremely loud, whereas those above 105 are dangerous. Decibels are logarithmic, meaning that 100 decibels is ten times as loud as 90, 110 decibels is ten times as loud as 100, and so on.

Trains servicing the Terminal will pass through 55 at-grade public crossings within the Bay Area. Round trip travel of up to three unit trains per day through 55 at-grade crossing will result in about 2 hours of horn noise⁸⁴. Thus, every day that the Terminal operates, residents within communities along the rail line will be exposed to nearly 2 hours of extremely loud train horns.⁸⁵

While impacts to quality of life from repeated loud noise are self-evident, chronic noise exposure has been proven to cause adverse health effects, including cardiovascular disease; cognitive impairment in children; sleep disturbance and resultant fatigue; hypertension; arrhythmia; increased rate of accidents and injuries; and exacerbation of mental health disorders such as depression, stress and anxiety, and psychosis.⁸⁶

Secondary effects from sleep disturbance can also occur including fatigue, depressed mood and well-being, and decreased performance and alertness. Cardiovascular effects, independent of sleep disturbance, can also occur with acute exposure to noise mostly due to elevated blood pressures and levels of stress-induced hormones. In addition, noise can exacerbate

Project (http://www.portoflosangeles.org/EIR/SPWaterfront/DEIR/AppxD3_HRA.pdf); Four Commerce Railyards (http://www.arb.ca.gov/railyard/hra/4com_hra.pdf); BNSF Watson (http://www.arb.ca.gov/railyard/hra/bnsf_watson_hra.pdf).

⁸⁴ Daily duration of train noise: 20-seconds/sounding x 55 at-grade crossings x 6 train trips/day = 6,600 seconds= 1.83 hours.

⁸⁵ <http://www.coaltrainfacts.org/key-facts#trains>.

⁸⁶ <http://www.coaltrainfacts.org/key-facts#sthash.X5aI5sYT.dpuf>.

stress and anxiety and impair task performance. The National Institute for Occupational Safety and Health recommends less than 15 minutes of exposure per day to noises over 100 dB.⁸⁷

Visual Impacts

The Terminal, located at the foot of the new Bay Bridge and adjacent to communities in West Oakland, will not be fully enclosed based on currently available design drawings. Thus, the various components will be visible from West Oakland, local freeways, and the Bay Bridge. These components include the Commodity A storage buildings, enclosures that are about 100 feet high and 203 feet in diameter⁸⁸ and the Commodity B dome which is 142 feet high and 167 feet in diameter.⁸⁹ Also visible will be thousands of feet of conveyors and the ship loading apparatus. These massive structures will block views of the Bay and attract attention of passing motorists, which could potentially lead to accidents.

CONCLUSION

In summary, many adverse impacts would result if coal were imported at the proposed Terminal, rather than other materials. These include:

- High water usage to control Terminal dust, especially significant in light of the California drought and further anticipated impacts from climate change
- Adverse public health impacts from coal dust and diesel particulate matter emitted by unit coal trains and the facility,
- Increased potential of train accidents that could adversely impact the state's water supply,
- Adverse aquatic and riparian ecosystem impacts adjacent to the rail lines,
- Adverse noise and vibration impacts along the rail lines and in West Oakland near the Terminal, and
- Adverse traffic impacts, including delayed response time of emergency vehicles.

None of these impacts were anticipated in the CEQA review of this Project. Further, none of the mitigation measures listed in the Sept. 8, 2015 Stice & Block Letter address these impacts. None of these impacts would be mitigated by any of the permits that must be obtained to operate the Terminal.

⁸⁷ <http://www.coaltrainfacts.org/key-facts#trains>.

⁸⁸ Conceptual Drawing BMH-142.

⁸⁹ Conceptual Drawing BMH-150.