A RAIL EMISSION STUDY: FUGITIVE COAL DUST ASSESSMENT AND MITIGATION

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ABSTRACT

A four-year study on fugitive coal dust emissions has produced estimates of coal loss during rail transport and developed suppression techniques that can reduce dusting from rail cars by 95 to 99%. The critical issues of emission characterization and material loss quantification had to be resolved before cost effective dust control strategies could be implemented and evaluated. Laboratory assessments, computer-based simulations, and field experiments were used to model and quantify coal dust emissions. These methods revealed coal losses along a ~500 mile-long rail corridor of up to 0.6 tons/car, with typical losses of 0.2 to 0.4 tons/car from metallurgical coals occurring under sunny, dry and windy conditions. A combination of load-top grooming, surfactants, and chemical binding agents proved to be the most effective method for reducing fugitive coal dust emissions during transit.

INTRODUCTION

Fugitive coal dust from in-transit coal cars does not appear to violate ambient air-quality standards. In fact, track-side monitoring of PM-10/TSP yielded no firm basis for remedial action. At issue, however, is the railroad's goal to reduce coal dust emissions and their impact as a nuisance pollutant.

Most of the evidence of fugitive coal dust emissions comes from anecdotal reports of dust plumes or the observations of coal deposition along the rail corridors. Without any standards of objectivity, coal dust complaints have given rise to the perception of significant a coal dust problem. Accordingly, a study was designed to relate the perceived problem (i.e., visual emissions) to the existence of quantifiable material losses (i.e., material losses that may represent significant environmental impact and/or financial consequences).

Previous attempts to quantify material losses produced mixed and controversial results, (Brown and Speichert, 1976; Guarnaschelli, 1977; Hardy Associates, 1979; Cope, 1980; McCoy, 1980; Williams, et al., 1982; Nobel, et al., 1983; Morrison, Hershfield Ltd., 1983; Cope, et al., 1984; Swan Wooster Engineering Co. Ltd. 1985; Environmental Sciences Ltd., 1985; Cope, et al., 1986; Wituschek, et al., 1986; Stewart, et al., 1987; Mikula and Parsons, 1988). Therefore, the characterization and quantification of losses along Norfolk Southern's (NS) rail corridors were identified as critical issues to be resolved before prescribing effective control strategies. Since early 1991, NS and Simpson Weather Associates (SWA) have conducted numerous laboratory and field-rail experiments to assess the magnitude of material losses and develop techniques to mitigate fugitive coal dust emissions during transit. A coal shipper, CONSOL also contributed to the field studies. This paper presents an overview of the study's ongoing efforts and results to date.

GENERAL STUDY APPROACH

The Norfolk Southern Rail Emission Study (NSRES) was conducted within one rail corridor, through which primarily export metallurgical (met) coal was transported. The choice of the rail corridor was based on its variety of terrain, relatively heavy volume of coal traffic, and the number of coal-dust complaints received. Metallurgical coal was chosen since, in most cases, it is considered more dusty than steam coal.

Field Trials

In an attempt to overcome some of the problems encountered in previous studies, the NSRES employed a number of independent field measurements to 1) act as quality-assurance checks within data sets, 2) to identify and understand aberrant measurements, and 3) to corroborate findings between data sets. Much of the early field data was gathered using a specially designed research caboose. As the study progressed, the instrumentation became more compact, thus reducing the need for the research caboose.

Scale Weights

The first of the field data sets is car weights. These weights were measured using static, decoupled, electronic scales. The scales have a reported accuracy of 0.01%. The weights were taken of selected cars before transit and then again after transit. As a reference, a scale monitor car that traveled with each weighing experiment was weighed at both locations to determine a scale correction factor. In addition, a tarped coal car was used, on occasion, as a second reference. It was assumed that no coal was lost during transit from the tarped car, and moisture loss and gain was minimized. To accurately evaluate the weight changes in coal cars moving from mine to port, moisture variations were taken into account. To account for moisture changes, a water budget was developed containing all known variables of moisture movement in and out of coal cars. Measured rainfall and estimated evaporation values were assigned to the water budget variables so that moisture changes could be used to adjust the scale weight differences. Moisture change correction factors were also empirically generated from coal samples collected in the field. In spite of all the precautions taken to assure accurate scale weights, an uncertainty in coal losses $\pm$ 200 lbs. still remains. This is most likely due to inherent scale inaccuracies and moisture changes that cannot be precisely measured, such as water dripping out the bottom of hopper doors. Because similar problems with scale weights have been encountered in other railroad work, we decided not rely on scale weight changes as the sole determinate for material losses. Rather, we used scale weights and three other methods jointly to arrive at a material loss estimates. These other methods are described below.

Load-top Volume Changes

The second method used to estimate material losses involved measuring the volume changes on the top of the coal loads from the mine to port. For the first several fields trials, a series of photographic transects were taken in selected coal cars at various points along the rail corridor. Scaled photographs of the same cars were compared throughout the trip and material losses were calculated based on volume losses within a given car. Coal within each car settling was taken into account and samples were taken to obtain bulk densities for the mass-loss calculations. It should be noted, that as a part of these calculations, we assumed that no coal was detrained from the top, flat portion of the coal load during transit. Because of this assumption, mass-loss calculations based on volume losses tended to ***underestimate*** actual material losses.

The photographic method of calculating, while general successful, encountered problems related to the changes in bulk densities of coal as it dries and drifts and inadequate measurements in the fronts and rears of cars where significant erosion and redeposition can occur during transit. In addition, the photographic method was very labor intensive. Consequently, another method was developed to estimate volume changes and evaluate redistribution of coal within a car. This method, called the Coal Car Load Profiling System (CCLPS), used three cameras to produce a digital contour map of the coal surface and calculate volume changes from mine to port within a given car. Recently, the CCLPS data gathering process has evolved into an infrared laser-based system which is smaller, faster, and does not require special lighting as did the three-camera technology.

Real-time Observations

To characterize the nature of fugitive dust emissions and develop an understanding of the wind erosion processes on coal cars during transit, an instrument package was designed to monitor a variety of environmental parameters in real time as the cars moved down the rail corridor. The instrument package, Rail Transport Emissions Profiling System (RTEPS) measured the following variables: wind speed, wind direction, rainfall, coal surface

temperature, coal temperature and moisture at two different depths, fugitive emissions (using a real-time aerosol sensor, or RAS), air temperature, and relative humidity. All of these data were collected and stored in a data logger attached to RTEPS and were retrieved via a lap top computer at various locations along the corridor. A time-lapse video camera was also part of RTEPS to provide visual records of emission events.

Passive Collection

To directly sample detrained material in transit, passive collectors were designed and built to mount on the rear sill of test cars. The passive collectors were sampled a various stops along the rail corridor to help identify the dustiest portions of the trip.

Dust Suppression Techniques

Once is was determined how much coal was being lost during transit, several mitigation techniques were evaluated, including:

- water only (40 to 100 gallons/car, depending on the experiment);
- grooming ("rounding" of the load profile) only;
- water and compaction;
- surfactants only;
- surfactants plus binding agents;
- binding agents only; and
- tarped cars (used as control cars for various experiments).

Experiments were also conducted where the average train speeds were decreased, and where trips were run mostly at night to decrease emissions. While lower train speeds and coal surface temperatures produced less stress on the coal loads and therefore lower emissions, such operational constraints were neither sufficiently effective nor practical and therefore were not seriously considered as permanent mitigation techniques. In addition, several load profile modifications were used alone, and with the treatments listed above, to abate fugitive dust emissions. Initially, a "normal" profile had a trapezoidal cross-section as shown in Figure 1a. After it was shown that profile modification alone significantly reduced emissions, the "bread-loaf" or groomed profile became the norm (Figure 1b). Other grooming/loading options included loading the coal flat, at or below the car sill level, loading lower than normal, and reshaping the top of the load into the "bread-loaf" shape. For clarification, the following definitions are given for surface treatments.

Normal profile: for the first sixteen field trials, cars that had a trapezoidal cross-section (Figure 1a); for the last fourteen field trials, cars that had an arcuate or " bread-loaf" cross-section (Figure 1b).

Groomed profile: any car that had an arcuate cross-section, or was modified to eliminate angular or trapezoidal cross-section.

Untreated cars: cars that may or may not be groomed, but received no additional water spray, surfactants, nor chemical binders.

Treated cars: cars that may or may not be groomed, but did receive additional water spray and/or surfactants, and/or chemical binders.

RESULTS

Laboratory Evaluations

Using the relative dusting index generated from the SARTDX experiments, coals were ranked according to their dusting potential. The final overall rankings were based on combining three dusting parameters: 1) wind speed

threshold (WST), or the lowest wind speed at which emissions were detected; 2) maximum real-time aerosol monitor (RAM) readings; and, 3) total integrated emissions (IE), the calculated area under the entire emissions curve.

Interestingly, when the overall dustiness rankings based on the above three parameters were compared to what the rankings would have been based only on moisture content and fines content, the rankings were found to be discordant. While it is assumed that moisture content and size consist do play a role in a coals' dusting potential, it is clear that other factors (e.g., coal chemistry, moisture migration through the coal, and angle of repose) can play an equally important or even dominant role in dusting during transit.

For the 19 different coals tested in the SARTDX experiments, the inherent coal moisture contents ranged from 2.8 to 11.4%. In order to test all coal samples under the same conditions, it was necessary to dry all samples to approximately 1.5% moisture content ($\pm$ 0.5%). It is fully recognized that such drying procedures do not reflect actual field conditions, as moisture contents vary significantly from mine to mine. However, the drying process allowed for marked and consistent delineations between the different coals' dusting potential, which was the objective of the SARTDX experiments. Figures 2 a and b, below, show SARTDX wind tunnel plots for two coals. Coal # 1, (Figure 2a) displays a moderate tendency to dust, while Coal # 2 (Figure 2b) shows a much greater propensity to dust during transport. This is displayed in the upper parts of the graphs, along the "Mini-Ram" axis.

Field Studies

Scale Weight Changes

During the field trials, 317 cars were weighed. For the earlier field experiments, a normal profile for a fully loaded coal hopper was trapezoidal in cross-section, had a smooth flat top-surface, and was stacked approximately eighteen to twenty-four inches above the car sill. After taking moisture changes into account, the normally loaded, untreated cars lost an average of 0.36 tons ($\pm$ 0.1 tons), n = 52. The range for the scale-weight losses was from 0 to 0.6 tons, and some cars actually showed a weight gain--due to water uptake during transport. The greater losses occurred during the most severe (hottest and driest) conditions in the summer months, when wind and train speed averages were highest compared to other field trials.

Those cars that were loaded at or below the sill appeared to loose less coal in most cases, compared to normally loaded and untreated loads, but this difference was not statistically significant. Furthermore, these loading techniques reduced the load capacity for each car by 10 to 15%. Since loading at or below the sill gave mixed dust control results and reduced the load capacity, this dust suppression strategy was abandoned.

For the most recent field trials, the normal load-out procedure was changed to a "bread loaf" profile. The change in profile produced a measurable reduction in the weight losses for the untreated cars, with an average of approximately 0.20 tons ($\pm$ 0.1), down from the 0.36 tons for ungroomed cars. While load profile changes produced significant decreases in weight losses, further reduction in material losses (95 to 99% from untreated cars, based on passive collection) was achieved by applying surfactants and/or binding agents to the groomed profiles.

RTEPS Data

The RTEPS instrument package offered an independent and corroborative perspective of material losses compared to the scale weight changes and passive collection. RTEPS was not designed to quantify material losses, but to record in real time the intensity and frequency of dusting "events." We emphasize that the emissions are a relative measure (relative to no emissions), and do not represent material losses. There is a strong positive correlation between frequent, intense dusting events during the course of a trip and its scale weight changes and passive collection. Furthermore, the higher the average coal surface temperatures, wind speeds and train speeds, the more frequent and intense the dusting events became (Fig. 3). While riding behind the coal trains in the research caboose, it was clear that dusting increased when coal cars passed through tunnels, over trestles, and

close to topographic interfaces. RTEPS data also showed that emissions were most frequent during accelerations between fifteen and thirty miles per hour. The most frequent and intense emissions occurred when the study trains passed other trains moving in the opposite direction at track speeds.

Load-top Volume Changes

The original photographic method for estimating volume changes produced material loss estimates of 0.11 to 0.76 tons, with an average of 0.31 tons (n = 31). For these same cars, scale weight losses averaged 0.36 tons, thus providing some credence to the claim that the photographic method underestimates material losses. An example of "before" and "after" transects are shown in Figure 4. The photographic method also laid the foundation for an automated volume-change detection system such as CCLPS. As CCLPS becomes further developed, we hope to obtain more and more reliable results from our volume/mass-loss calculations.

Trip Stress Index (TSI)

In order to compare the stresses from trip to trip, an index was devised from information collected with RTEPS. Air temperature, coal surface temperature, and wind speed were combined to arrive at a Trip Stress Index (TSI), allowing direct comparison of the stresses from each trip. A relationship between passive collection and TSI was revealed through data analyses and is discussed below.

Passive Collection

Over the course of the thirty field trials, a total of 360 passive collector samples have been taken. The combination of profile modification and chemical sprays has resulted in a 95 to 99% reduction in coal losses compared to normal trapezoidal load profiles according to passive collection data. Statistical analyses of passive collection show that treated cars can be distinguished from untreated cars with a 99.9% confidence level. Table 1 depicts the average passive collection over all trips for untreated versus treated cars. The 153 passive collector samples not shown were either collected during "experimental" treatments, or there was no direct comparison available for treated versus untreated cars for a given experiment.

There appears to be no useful correlation between scale weight changes and passive collection on a car-by-car basis, likely due to the inherent scale inaccuracies and moisture content variations. This is another reason not to rely on the scale weight changes alone for material loss estimates, but instead, to apply independent loss estimates techniques. However, a clear relationship between passive collection and TSI is revealed in Figure 5. This relationship appears to be exponential. On the other hand, the data suggest that there is some threshold above which passive collection (i.e., fugitive emissions) significantly increases.

Surface Treatment Evaluations

As previously mentioned in the "Methodology, Surface treatments" section, a variety of surface treatments were tested during the study for their dust suppression capabilities. Using untreated cars as the reference for judging the success of treatments, results from RTEPS show that water-only treatments, whether sprayed on at the mines or en route, suppressed fugitive emissions for a maximum of only two to three hours under stressful conditions during a thirty-six to seventy-two hour trip. In fact, untreated surfaces actually emitted less dust than water-only treated cars under certain conditions (e.g. freezing temperatures). This was the case for both groomed and ungroomed cars. Grooming alone reduced passive collection and scale weight losses from an average of 0.36 tons to 0.20 tons during the most stressful trips. When profile grooming was combined with chemical treatments, even greater reduction in fugitive emissions was realized, up to 95% over untreated cars.

CONCLUSIONS

A total of thirty field trials have been conducted to date for the NSRES.

Analyses and stratification of a 360,000-car database yielded a standard deviation of about 6 tons in dump weights, masking any meaningful signal for weight losses for the NSRES.

Material losses based on scale weight changes for ungroomed, untreated cars averaged about 0.36 tons/car under high stress trip conditions.

Material losses based on scale weight changes for groomed, untreated averaged about 0.20 tons/car in the high stress trip conditions.

Intensity and frequency of emissions are greatest when the train is accelerating between 15 and 30 miles per hour, and when passing on-coming trains.

Increased fugitive emission events are associated with tunnels, trestles, and topographic interfaces.

The relationship between the Trip Stress Index and passive collection indicated that there is a stress threshold above which fugitive emissions significantly increase.

Based on passive collection, material losses from groomed, treated cars were reduced by up to 95% over untreated and ungroomed cars.

ACKNOWLEDGMENTS

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Table 1. Passive Collection for Untreated Versus Treated Cars

UNTREATED CARS AVERAGE (g)	TREATED CARS AVERAGE (g)
n = 113	n = 94
131	5

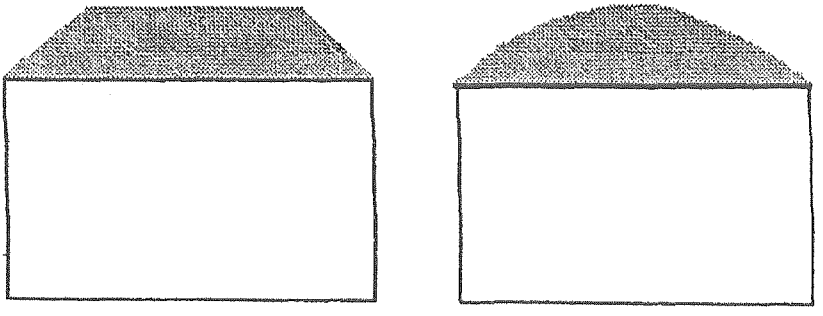

Figure 1a (left) and 1b (right). Cross Sections of Coal Hoppers with Trapezoidal Profiles (1a) and Rounded Profiles (1b)

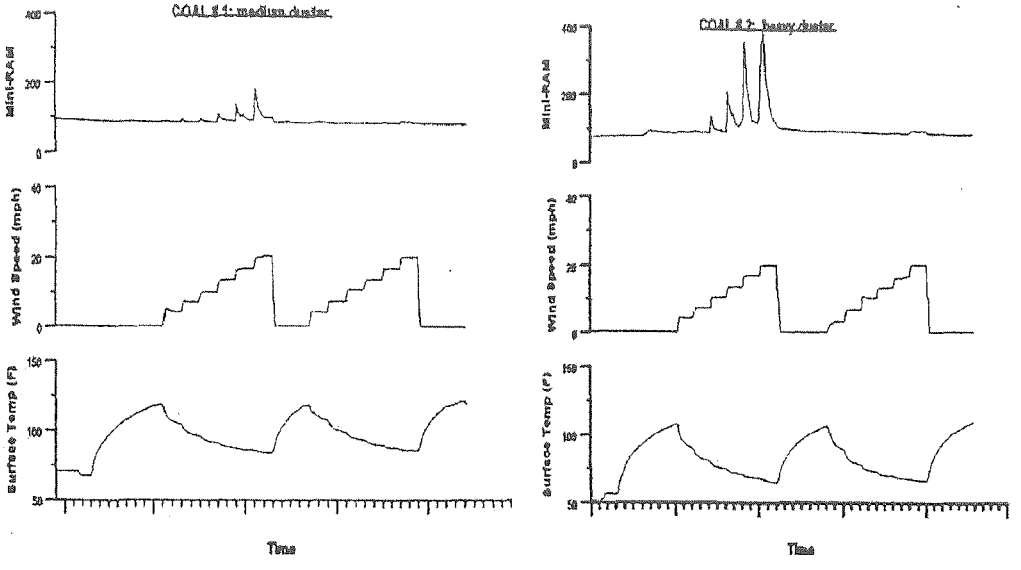

Figure 2a (left) and 2b (right). Graphical Difference Between "Medium" and "Heavy" Dusty Coals According to SARTDX Procedures

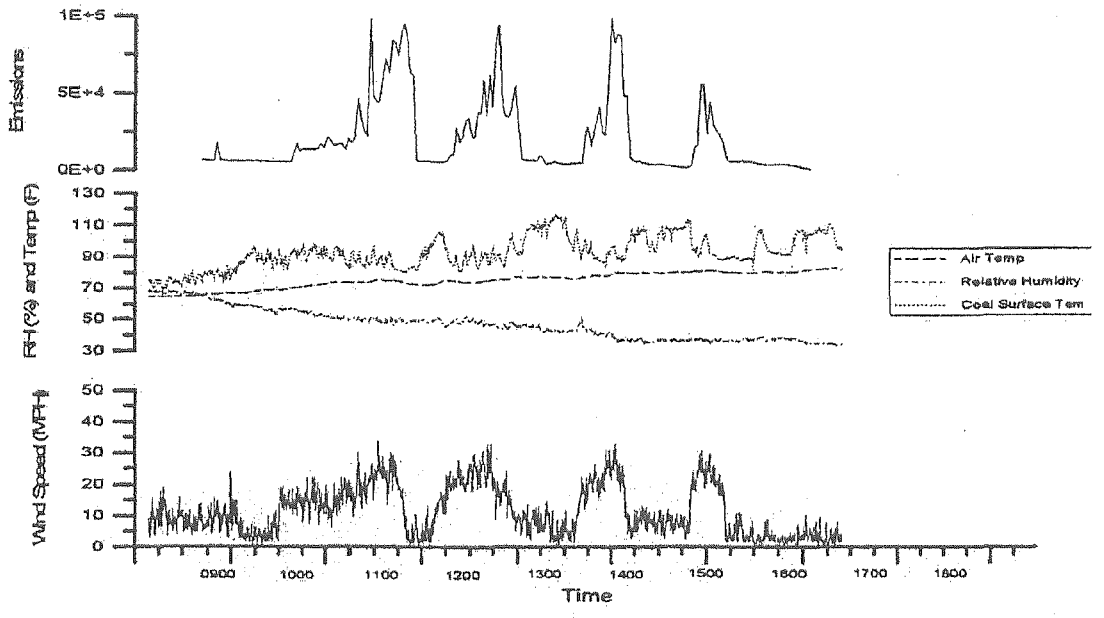

Figure 3. A Typical RTEPS Trip Profile Showing the Correlation Among Emissions, Coal Surface Temperature, and Wind Speed

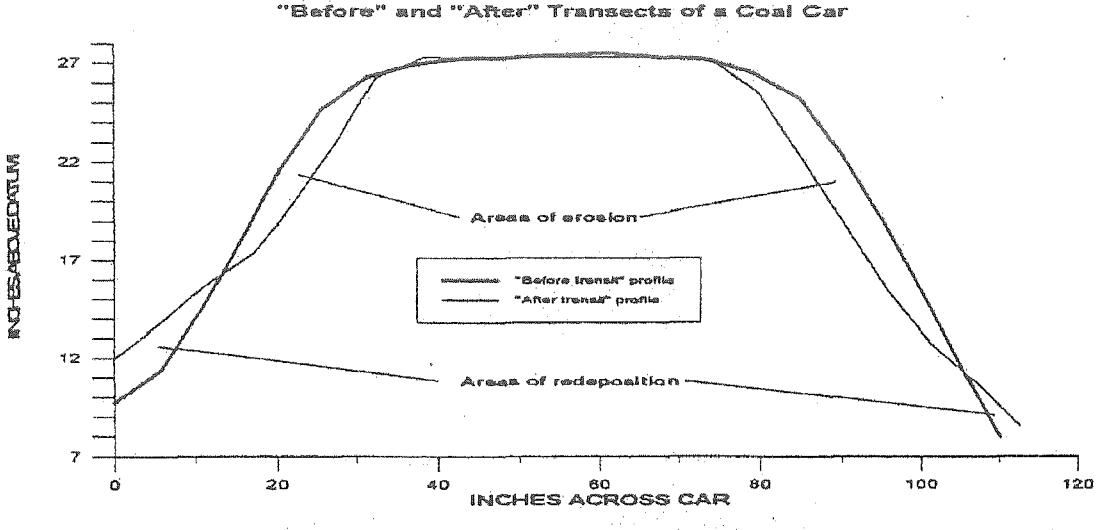

Figure 4. An Example of a Photographic Transect Across an Untreated Car Showing Areas of Erosion and Deposition

Figure 5. Trip Stress Index Versus Passive Collection

FitchRatings

Fitch Rates Port of Long Beach, CA's Harbor & Rfdg Revs and Rev Notes at 'AA'; Outlook Stable

Ratings Endorsement Policy

15 Apr 2014 4:38 PM (EDT)

Fitch Ratings-San Francisco-15 April 2014: Fitch Ratings assigns a 'AA' rating to the Port of Long Beach's $59.9 million of harbor refunding revenue bonds, series 2014A and 2014B, and $325 million of harbor revenue short-term notes, series 2014C, issued by the city of Long Beach, California.

In addition, Fitch affirms the Port of Long Beach's $602 million in outstanding harbor revenue bonds and harbor revenue refunding bonds at 'AA'.

The Rating Outlook on all bonds is Stable.

The rating reflects the port's strong market position as the 2nd largest U.S. container port, with resilient revenues stabilized by long-term contractual guarantees that are sufficient to cover the port's outstanding debt obligations. The port's sizable long-term capital improvement plan (CIP), while costly, will help ensure the port's competitive position going forward. Strong financial metrics and considerable liquidity help support the port's rating as it executes its capital plan.

KEY RATING DRIVERS

Strong Market Position: The Port of Long Beach is the nation's second largest container port, located on the west coast. When combined with the Port of Los Angeles, the two constitute the San Pedro Bay Port Complex and are the seventh largest port complex in the world. Fiscal 2013 20-foot equivalent units (TEUs) were 6.7 million, a 13.5% increase over 2012 but still 8% below fiscal 2007 peak levels. Revenue Risk - Volume: Stronger

Resilient Revenue Stream Despite Exposure to Volatility: With a large majority of operating revenues coming from the container business, the port is exposed to fluctuations in international trade and growing competitive pressures, which can lead to volume volatility. However, the port's revenues are largely insulated from trade-related volatility due to long-term guaranteed contracts with most tenants, covering nearly 70% of operating revenues. Revenue Risk - Price: Stronger

Modern Facilities, Sizable Capital Program: The port's capital program through 2023 is sizable at approximately $4.0 billion. Additional borrowing of $1.6 billion is anticipated as part of the capital program, with 80% anticipated in the next five years. Careful management of the plan's scope and cost relative to business demand so as to maintain the port's very strong financial profile is important. The port's terminal facilities are modern and contiguous, and the port benefits from favorable rail and highway connections within the LA region and to external markets through the Alameda Corridor. Infrastructure Development/Renewal: Midrange

Debt Structure: The port's senior bonds are all fixed rate and benefit from strong covenants. The port's board has passed an ordinance requiring management to a minimum of 2.0x net debt service coverage ratio (DSCR) (which will be applied to the expected subordinate TIFIA loan) and 600 days cash on hand, which will serve to protect bondholders as additional leverage for the CIP is brought online. Debt Structure: Stronger

Excellent Financial Profile: The port has a healthy balance sheet with a strong liquidity position, albeit lower than previous years due to use of cash for the ongoing CIP. 2013 liquidity of $240 million represents 896 days cash on hand. Debt service coverage has remained above 3.0x since 2011. Port leverage is low at 1.5x net debt/cashflow available for debt service (CFADS) on senior obligations (1.9x when balances on revolving lines

of credit are included), though this may rise to the 4x - 5x range if the full capital plan is executed.

RATING SENSITIVITIES

--Higher than anticipated volatility or a steady downward trend in port container volumes;
--Financial forecasts indicating debt service coverage levels falling below the 2.0x management policy;
--Upward revisions to the capital program or debt funding that could indicate weaker debt metrics or measurably reduce port liquidity.

SECURITY

All bonds are secured by a gross lien on port revenues.

TRANSACTION SUMMARY

The Port of Long Beach expects to issue approximately $59.9 million in harbor revenue refunding bonds, series 2014A and 2014 B, to refund $88.6 million in outstanding series 2002A, 2004A, and 2004B revenue bonds. Proceeds will also cover costs of issuing the 2014A and 2014B bonds. The refunding is expected to generate level savings without an extension of the current bonds' maturity of 2027. Present value savings is estimated at over 10% of refunded par.

The Port of Long Beach also expects to issue up to $325 million in Harbor Revenue Short Term Notes, Series 2014C. The notes are fixed rate and on parity with existing senior bonds, maturing in 2017. The notes will be used to help finance the replacement of the existing Gerald Desmond Bridge located at the Port of Long Beach. Proceeds will also fund a period of capitalized interest on the 2014C notes, repay a portion of the Port of Long Beach's outstanding revolving facility, and cover costs of issuance. The port's plan of finance anticipates, but does not require, that the notes will be repaid with the proceeds of a subordinate TIFIA loan.

Container volumes at Long Beach have improved since the recession, with 2013 showing a healthy increase in throughput of 13.5%. The overall trend in TEUs remains one of growth, with the 2002 - 2013 CAGR at 2.5%. The first five months of fiscal 2014 have seen a further modest increase, with year to date TEUs through February up 2.3% over the previous year. In fiscal 2013, the port's total operating revenues were $346 million, a 3.7% increase over 2012. For the first three months of fiscal 2014, operating revenues are 2.6% above the same period in 2013.

Declines and recoveries in volumes have had limited impact on the port's rating, largely due to the revenue stabilizing nature of the port's long-term leases with its largest tenants. These long-term lease contracts collectively contain minimum payment provisions that are more than sufficient to cover annual debt service requirements on the outstanding debt. Management has indicated that key tenants desire to maintain long-term operations at the port, with tenants already secured for the middle-harbor project.

The port's top 20 tenants accounted for over 90% of port operating revenues in fiscal 2013, and contractual minimum revenue guarantees accounted for $236 million (68% of operating revenues), sufficient to cover senior debt service obligations 1.73x (net of operating expenses). From fiscal 2014 onwards, minimum guarantees increase to $265 million or higher, reflecting guarantees relating to the middle harbor project, and providing 2.0x net coverage of debt service obligations, including the expected subordinate TIFIA loan.

Historically the port has maintained high debt service coverage levels, with net coverage at or above 3.0x both prior to the recession and since fiscal 2011. Coverage remains well above the rate covenant of 1.25x gross coverage. Cash reserves are robust with $240 million in unrestricted funds which translates to 896 days cash on hand. The port manages to a minimum of 2.0x net coverage and 600 days cash on hand, per an ordinance by the Board of Harbor Commissioners in October 2011. Fitch views this policy as providing liquidity stability for bondholders, and sees continued management to these levels as important to maintenance of credit quality. Fitch notes that potential contingent liabilities to ACTA for debt payments, although none are currently projected, are legally subordinate to port revenue bonds.

Both San Pedro Bay ports (Los Angeles and Long Beach) are well-positioned in terms of both portside and inter-modal infrastructure, allowing them to accommodate both local and non-local shipments. However, with 50% of cargo destined for inland markets, competition for this cargo may increase as the Panama Canal

expansion project reaches completion in 2015. Under various scenarios that contemplate drops in cargo volumes due to diversion or other events; funding of the full capital plan with an additional $1.3 billion of debt obligations per management's projections; and careful management of operating and capital expenditures, forecasted all-in debt service coverage levels are expected to remain in excess of 2.0x, including debt service on the expected subordinate TIFIA loan. Should volume stagnate or should the port fail to manage its expense profile prudently, the port may need to delay or defer certain elements of the capital program in order to maintain these coverage levels. Failure to maintain coverage above 2.0x in keeping with the port's debt ordinance will jeopardize the current rating.

The port's CIP through 2023 totals approximately $4 billion, with projects including the middle-harbor redevelopment project ($1.3 billion), replacement of the Gerald Desmond Bridge ($1.3 billion), and the modernization of Pier G ($1.0 billion). While the current plan anticipates issuing $1.6 billion for these projects ($1.3 billion over the next five years), including a subordinate TIFIA loan in the context of the bridge replacement, management indicates that timing is flexible for several of the projects, and projects may be deferred or scaled down should market conditions change. While costly, the CIP improvements will help the port maintain its competitive position and service newer, larger ships. Fitch will be monitoring whether upcoming leadership changes at the port could impact the scope, prioritization, and timetable for infrastructure renewals.

For more information on the Port of Long Beach, please see Fitch press release 'Fitch Affirms Port of Long Beach, CA's Harbor & Rfdg Revs at 'AA'; Outlook Stable' dated April 2, 2014 available at www.fitchratings.com.

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Applicable Criteria and Related Research:
--Rating Criteria for Infrastructure and Project Finance (July 12, 2012);
--'Rating Criteria for Ports' (Oct. 3, 2013).

Applicable Criteria and Related Research:
Rating Criteria for Infrastructure and Project Finance
Rating Criteria for Ports

Additional Disclosure

Solicitation Status

FitchRatings

Fitch Rates Port of Long Beach, CA's Harbor TIFIA Loan 'AA-'; Outlook Stable

Ratings Endorsement Policy
20 May 2014 5:12 PM (EDT)

Fitch Ratings-New York-20 May 2014: Fitch Ratings assigns an 'AA-' rating to the Port of Long Beach's $325 million TIFIA loan agreement, issued by the city of Long Beach, California for the Gerald Desmond Bridge Project. The Rating Outlook is Stable.

Fitch also maintains ratings on the Port of Long Beach's outstanding senior lien harbor revenue and refunding bonds, which are rated 'AA' with a Stable Outlook. For more information on Fitch's view of outstanding senior lien obligations, please see 'Fitch Affirms Port of Long Beach, CA's Harbor & Rfdg Revs at 'AA'; Outlook Stable' dated April 2, 2014, and 'Fitch Rates Port of Long Beach, CA's Harbor & Rfdg Revs and Rev Notes at 'AA'; Outlook Stable' dated April 15, 2014. Both reports are available at www.fitchratings.com.

The rating on the TIFIA loan reflects the subordinate claim on gross revenues, together with the port's strong market position as the second largest U.S. container port, with resilient revenues stabilized by long-term contractual guarantees that are sufficient to cover both the port's outstanding senior debt obligations and the subordinate TIFIA loan. Going forward, contractual guarantees are expected to continue to provide revenue stability as the port proceeds with expected future borrowing for its sizable long-term capital improvement plan (CIP). This plan, while costly, will help ensure the port's competitive position going forward. Strong financial metrics and considerable liquidity expected throughout execution of the CIP help support the port's rating.

KEY RATING DRIVERS

Strong Market Position: The Port of Long Beach is the nation's second largest container port, located on the west coast. When combined with the Port of Los Angeles, the two constitute the San Pedro Bay Port Complex and are the seventh largest port complex in the world. Fiscal 2013 20-foot equivalent units (TEUs) were 6.7 million, a 13.5% increase over 2012 but still 8% below fiscal 2007 peak levels. Revenue Risk - Volume: Stronger

Resilient Revenue Stream Despite Exposure to Volatility: With a large majority of operating revenues coming from the container business, the port is exposed to fluctuations in international trade and growing competitive pressures, which can lead to volume volatility. However, the port's revenues are largely insulated from trade-related volatility due to long-term guaranteed contracts with most tenants, covering nearly 70% of operating revenues. Revenue Risk - Price: Stronger

Modern Facilities, Sizable Capital Program: The port's capital program through 2023 is sizable at approximately $4 billion. Additional borrowing of $1.6 billion is anticipated as part of the capital program, with 80% anticipated in the next five years. Careful management of the plan's scope and cost relative to business demand so as to maintain the port's very strong financial profile is important. The port's terminal facilities are modern and contiguous, and the port benefits from favorable rail and highway connections within the LA region and to external markets through the Alameda Corridor. Infrastructure Development/Renewal: Midrange

Debt Structure: The port's senior bonds are all fixed rate and benefit from strong covenants. The subordinate TIFIA loan is also fixed rate, and benefits from a fixed amortization profile with any changes subject to approval by the TIFIA lender. The port's board has passed an ordinance requiring management to a minimum of 2.0x net debt service coverage ratio (DSCR) (which applies to both senior and the subordinate TIFIA loan) and 600 days cash on hand, which serve to protect bondholders as additional leverage for the CIP is brought online. Debt Structure (Senior): Stronger. Debt Structure (Subordinate): Midrange

Excellent Financial Profile: The port has a healthy balance sheet with a strong liquidity position, albeit lower than previous years due to use of cash for the ongoing CIP. 2013 liquidity of $240 million represents 896 days cash on hand. Senior debt service coverage has remained above 3.0x since 2011, and is projected to remain at or above 2.0x through the forecast period for both senior and subordinate obligations, including the TIFIA loan. 2013 port leverage is low at 1.2x net debt/cashflow available for debt service (CFADS) on senior obligations (1.5x when balances on revolving lines of credit are included, and 2.7x when $325 million is included for the TIFIA loan), though this is expected to rise to the 4x - 5x range as the full capital plan is executed.

RATING SENSITIVITIES

--Higher than anticipated volatility or a steady downward trend in port container volumes;
--Financial forecasts indicating all-in (senior and subordinate) debt service coverage levels falling below the 2.0x management policy;
--Upward revisions to the capital program or debt funding that could indicate weaker debt metrics or measurably reduce port liquidity.

SECURITY

The TIFIA loan is secured by a first lien on the port's subordinate revenues, or gross revenues of the port remaining after the payment of debt service on senior bonds and other senior obligations and the funding of any debt service reserve funds established for the senior bonds and other senior obligations.

TRANSACTION SUMMARY

The port is seeking a direct TIFIA loan in the amount of $325 million to reimburse costs incurred in the replacement of the Gerald Desmond Bridge (the 'bridge'). The TIFIA loan will cover 25% of approximately $1.2 billion in costs associated with the bridge replacement project. The port does not intend to issue any additional public debt in support of the project, and the TIFIA loan is primarily being sought to lower overall project borrowing costs.

The TIFIA loan is subordinate to the port's existing senior debt. The interest rate on the TIFIA loan will be set at financial close, and the loan may not be disbursed until substantial completion has been achieved. The port anticipates drawing the loan within 12 months after substantial completion. The subordinate TIFIA loan is fixed rate, and benefits from a fixed amortization profile through fiscal 2052, with any changes subject to approval by the TIFIA lender. Two ratings of 'A-' or the equivalent on the TIFIA loan are required as condition precedent to the loan. Additionally, while the revolving lines of credit with Bank of America and Union Bank remain outstanding, a downgrade of senior obligations below 'A-' by two rating agencies constitutes an event of default under the loan agreement. Fitch views other events of default as typical for a TIFIA loan, though notes that there is no springing lien provision given the high rating of the port.

The TIFIA loan benefits from strong rate covenants, including 1.1x MADS on a gross basis, 1.0x on a net basis, and the requirement that subordinate revenues are sufficient to pay the sum of senior and subordinate debt obligations; required deposits to debt service reserves; and O&M expenses. Additionally, the port must notify TIFIA if coverage falls below 1.5x, providing an additional level of protection. If coverage falls below 1.25x, the port must fund a separate reserve for the TIFIA loan, equal to the least of 10% TIFIA principal; TIFIA MADS; and 1.25x TIFIA AADS. If the port is not maintaining reserves for any other bonds, the TIFIA reserve must equal the greatest semi-annual TIFIA debt service due on or prior to the earlier of the 10th anniversary of that determination date or final maturity. In addition to additional bonds tests of 1.1x gross and 1.0x net MADS coverage, borrowing for a permitted special facility requires 2.0x net coverage. While the pledge to the TIFIA loan is junior to that of the senior bonds, Fitch views the covenant package as strong, and feels these protections are adequate to achieve an 'AA-' rating, which is one notch off the senior bonds at 'AA'.

Located at the southern terminus of I-710, the bridge serves as a primary link between the two San Pedro Bay ports and warehouses and rail yards north of the ports, in the surrounding communities of East Los Angeles, Commerce, and Vernon. The Gerald Desmond is one of three bridges connecting surface highways to Terminal Island and providing connection between the cities of Long Beach and Los Angeles. The existing five-lane bridge is a physically deteriorated structure constructed in 1968. The new six-lane bridge has a planned

100-year design life, and will enable the port to accommodate projected increases in vehicular traffic on the bridge and commercial growth in the port, and allow for the increased size in container ships expected in the future.

Container volumes at Long Beach have improved since the recession, with 2013 showing a healthy increase in throughput of 13.5%. The overall trend in TEUs remains one of growth, with the 2002 - 2013 CAGR at 2.5%. The first seven months of fiscal 2014 have seen a further increase, with year to date TEUs through April up 2.8% over the previous year. In fiscal 2013, the port's total operating revenues were $346 million, a 3.7% increase over 2012. For the first three months of fiscal 2014, operating revenues are 2.6% above the same period in 2013.

Declines and recoveries in volumes have had limited impact on the port's rating, largely due to the revenue stabilizing nature of the port's long-term leases with its largest tenants. These long-term lease contracts collectively contain minimum payment provisions that are more than sufficient to cover both the port's outstanding senior debt obligations and the subordinate TIFIA loan. Going forward, contractual guarantees are expected to continue to provide revenue stability as the port proceeds with expected future borrowing for its sizable long-term capital improvement plan (CIP). Management has indicated that key tenants desire to maintain long-term operations at the port, with tenants already secured for the middle-harbor project.

The port's top 20 tenants accounted for over 90% of port operating revenues in fiscal 2013, and contractual minimum revenue guarantees accounted for $236 million (68% of operating revenues), sufficient to cover senior debt service obligations 1.7x (net of operating expenses). From fiscal 2014 onwards, minimum guarantees increase to $265 million or higher, reflecting guarantees relating to the middle harbor project, and over the next five years are expected to provide 1.5x or higher net coverage of debt service obligations, including the subordinate TIFIA loan.

Historically the port has maintained high debt service coverage levels, with net coverage at or above 3.0x both prior to the recession and since fiscal 2011. Coverage remains well above the rate covenant of 1.25x gross coverage. Cash reserves are robust with $240 million in unrestricted funds which translates to 896 days cash on hand. The port manages to a minimum of 2.0x net coverage and 600 days cash on hand, per an ordinance by the Board of Harbor Commissioners in October 2011. Fitch views this policy as providing liquidity stability for bondholders, and sees continued management to these levels as important to maintenance of credit quality. Fitch notes that potential contingent liabilities to ACTA for debt payments, although none are currently projected, are legally subordinate to port revenue bonds.

Both San Pedro Bay ports (Los Angeles and Long Beach) are well-positioned in terms of both portside and inter-modal infrastructure, allowing them to accommodate both local and non-local shipments. However, with 50% of cargo destined for inland markets, competition for this cargo may increase as the Panama Canal expansion project reaches completion in 2016. Under various scenarios that contemplate drops in cargo volumes due to diversion or other events; funding of the full capital plan with an additional $1.6 billion of debt obligations per management's projections; and careful management of operating and capital expenditures, forecasted debt service coverage levels for both senior and subordinate TIFIA obligations are expected to remain in excess of 2.0x in a base case scenario, and 1.6x or better in a combined downside case scenario. Should volume stagnate or should the port fail to manage its expense profile prudently, the port may need to delay or defer certain elements of the capital program in order to maintain these coverage levels. Failure to maintain coverage above 2.0x in keeping with the port's debt ordinance will jeopardize the current rating.

The port's CIP through 2023 totals approximately $4 billion, with projects including the middle-harbor redevelopment project, and the modernization of Pier G, in addition to the replacement of the Gerald Desmond Bridge. While the current plan anticipates issuing $1.6 billion for these projects ($1.3 billion over the next five years), which includes the subordinate TIFIA loan, management indicates that timing is flexible for several of the projects, and projects may be deferred or scaled down should market conditions change. While costly, the CIP improvements will help the port maintain its competitive position and service newer, larger ships. Fitch will be monitoring whether upcoming leadership changes at the port could impact the scope, prioritization, and timetable for infrastructure renewals.

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Applicable Criteria and Related Research:
--'Rating Criteria for Infrastructure and Project Finance' (July 12, 2012);
--'Rating Criteria for Ports' (Oct. 3, 2013).

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Rating Criteria for Infrastructure and Project Finance
Rating Criteria for Ports

Additional Disclosure
Solicitation Status

IN-TRANSIT CONTROL OF COAL DUST FROM UNIT TRAINS

by

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Environmental Protection Service

Fisheries and Environment Canada

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ABSTRACT

Effectiveness of chemical binders in controlling coal dust emanating from unit trains was investigated and monitored during 1974 and 1975. The parameters investigated included loading profile, type of chemical binder and spraying technique. A flat loading profile provided maximum retention of binder crust and simplicity of spray application. Oil products were the most effective binders. Almost equally effective were the oil and asphalt emulsions. Latex type chemicals formed brittle crusts that were easily fractured by torsional movement of the cars. A combination of simultaneous flooding and spraying was the most effective technique applied during the study. Coal trains from four mines were monitored for crust retention by measuring the percentage of crust cover remaining over the total car surface when the unit trains reached the terminals. Coverages of up to 95% were obtained; however, the crust coverages which most frequently occurred varied from 86% to 90%, 76% to 80%, 81% to 85% and 61% to 65%, depending on loading profile, type and concentration of chemical binder.

RÉSUMÉ

En 1974 et 1975, on a étudié et contrôlé l'efficacité de certains liants chimiques à éliminer la poussière de charbon se dégageant des trains intégraux. Les paramètres examinés comprenaient le profil de charge, le type de liant chimique et la technique d'arrosage. Le profil plat donnait à la croûte de liant une résistance maximale en même temps qu'il simplifiait l'application. Les produits huileux se sont révélés les liants les plus efficaces et les émulsions d'asphalte ont donné des résultats presque aussi valables. Les produits chimiques à base de latex formaient une croûte cassante que le mouvement de torsion des wagons brisait facilement. C'est le procédé combinant un jet de saturation et l'arrosage superficiel qui s'est révélé le plus efficace. En contrôlant les trains provenant de quatre mines, les techniciens ont mesuré l'adhésion de la croûte qui s'exprime en pourcentage de celle-ci demeurée intacte lorsque le train arrive à destination. Ils ont ainsi mesuré des couches protectrices intactes atteignant 95 p. 100 de la surface. Toutefois, les croûtes superficielles le plus souvent observées ont varié de 86 à 90 p. 100, de 76 à 80 p. 100, de 81 à 85 p. 100 et de 61 à 65 p. 100 en fonction du profil de la charge ainsi que du type et de la concentration du liant chimique.

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Specialized technical assistance was also freely given by staff of other Federal agencies, particularly Mr. Sam Payne of the Canadian Transport Commission for his monitoring work, and by my colleagues in the Environmental Protection Service.

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IN-TRANSIT CONTROL OF COAL DUST FROM UNIT TRAINS

1 CONCLUSIONS

(a) Results of the field studies proved that some chemical binders offered an immediate and satisfactory solution to controlling coal dust emanation from en route unit trains.

(b) Coal Spray 100 and Reclamation Oil were the most effective products used to control dust, principally because their regenerative properties were capable of sustaining a cohesive crustal cover which overcame surface cracks caused by torsional stresses of moving rail cars.

(c) Oil emulsion (DS200) and asphalt emulsions (DS100) produced 85% crustal coverage, which met acceptable government and operating mining company criteria.

(d) Properly formulated latex binders used on horizontal surfaces were as effective as oil emulsions, but on sloped surfaces they were less efficient.

(e) The Study Committee had postulated that crustal deficiencies on irregular coal surface profiles may be overcome if increased spraying on sloped surfaces was applied by an improved spraying method. The field test and observed results did not substantiate this theory, particularly in the case of latex products. These compounds are brittle after the curing period and do not re-polymerize on the surface of the coal cars.

(f) Complete dust control depends on a spraying technique which provides complete and controllable spreading of the binder, adequate quantities and concentrations of applied

chemical (gallons/car), the use of acceptable and readily available chemicals to the mining industry, and loading techniques which form flat loading profiles.

(g) Extensive monitoring confirmed that when latex products are used, crustal retentions of 85% can be readily achieved if the coal surface configuration is a central horizontal plane bounded by limited sloped ends. Crustal retention can be increased to 95%, if the front-end slope is made level with the horizontal central portion.

2 INTRODUCTION

2.1 Objectives

The study was designed to evaluate chemical methods of eliminating or minimizing wind dispersion of coal dust from open-top rail cars during transportation of coal from mine sites to terminal storage areas. Dust control techniques were to be tested and developed which would be economically acceptable and readily adaptable by mining and railway companies. In addition, the establishment of sound, proven control technology would become available to legislators as guidelines in formulating any necessary environmental control regulations.

2.2 Environmental Concerns

The clouds of wind-blown dust that emanate from moving trains are receiving considerable attention as an environmental issue in many countries. In Canada, concern about the air-borne transport and deposition of coal dust has been expressed by the public as numerous complaints to railway companies, operating mines, municipalities, Members of Parliament and government agencies. Supportive evidence in newspaper articles has also highlighted the pollution aspects.

Figure 1 illustrates the geographical range and monthly frequency distribution of complaints in the study area of British Columbia during 1972 - 1973. The peak of complaints during March to May, possibly reflects the public's tendency to object prior to the onset of the summer outdoor season, a time when their awareness of air-borne dust becomes more acute. Also, moisture deficient coal transported during dry months has lower compaction rates and is more susceptible to wind dispersion than during the wetter months of fall and winter. Evidence of this was observed following compaction tests* on a unit train where only 58% of total compaction had occurred after transportation of 180 miles.

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*Kaiser Resources, Internal Report

Physically, coal is black, nontransparent and relatively lightweight. In populated areas its black colour soils houses, swimming pools, terraces and clothing. The nontransparency creates highway hazards by reducing visibility, while its lower density makes it readily airborne and capable of being carried further than common silicate dust.

From a chemical viewpoint, coal mined in Western Canada has not been demonstrated to be acutely toxic to salmonids. Bioassays conducted by B.C. Research proved that liquid extracts from East Kootenay coal are acutely nontoxic to fish.[1]

Pollution by coal dust, then appears to be confined to some aesthetic values and to physical hindrance where excessive quantities of coal are deposited.

2.3 Coal Transportation in the Study Area

Coal is transported to British Columbia terminals by Canadian National Railways (CNR) and by Canadian Pacific Rail (CPR). CNR moves coal from two major mines located in Alberta (McIntyre Mines Limited and Cardinal River Coal) to Neptune Terminals Ltd. in North Vancouver. CPR transports coal from the East Kootenay (Kaiser Resources Ltd. and Fording Coal Ltd.) to Westshore Terminal, the superport at Roberts Bank in the Municipality of Delta.

Figure 1 shows the major coal mine locations and railway routes to the Vancouver terminals. During 1973, 11,303,539 short tons of coal were transported over the railway system, 8.3 million tons by CPR and approximately 3 million by CNR. Table 1 details the coal movements to British Columbia terminals during 1973. Future coal industry development will greatly increase the tonnages transported, particularly from the northeastern area of British Columbia. Such development will emphasize the need for effective en route coal dust control.

3 THE STUDY PROGRAMME

In February 1974, a committee of representatives from Kaiser Resources Ltd., Fording Coal Ltd., Canadian Pacific Rail and the Federal Government formulated a study and test programme to determine the relative effectiveness of available chemical binders as an immediate solution to the problem of coal dust control on moving unit trains.

3.1 Phase I - Planning and Preliminary Field Investigations (During 1974)

(a) Planning involved technical and logistic considerations to determine the following:

- The most economical and effective location to apply chemical spraying.
- The minimum number of rail cars per train required to obtain a conclusive test programme.
- The number and types of tests to be conducted to obtain base data for Phase II.
- Allocation of test sites, based on in-transit settling characteristics, where tests would be carried out.
- What test evaluation procedures and criteria would yield reliable data.
- Preliminary screening and assessment of available chemical products to be used in the field test work.

(b) Field Work

Initially, spraying locations other than the mine sites at Fort Steele, were considered to evaluate the possible advantages of spraying after coal compaction had taken place. Eventually all trains were sprayed at the mine sites (Kaiser and Fording) to avoid all pollution problems.

Each chemical product was tested on a maximum of five cars, with each car selected on the basis of representative profile and location at, or near, the head-end of the train, to avoid possible accumulation of coal dust escaping from other cars. Binding performance at the departure point, at Kamloops, and at the Vancouver terminal was recorded by each committee member on a Visual Observation Form (see Table 2). The final rating for each series of tests reflecting the opinion of the total *group* was recorded on Tables 3 to 10.

3.2 Phase II - Extension of Field Investigations to Complete Unit Trains

In order to confirm the test results and analyses obtained in the limited (five cars per train) Phase I work, B.H. Levelton and Associates Ltd. were contracted by Environment Canada to carry out control tests on complete unit trains during the period August 28th to September 30th, 1975. A synopsis of Levelton's report entitled, "Measurement of Crust Remaining on the Surface of Coal Cars on Arrival at Dumping Terminals - Results of Monitoring 30 Trains", is presented in Sections 9 and 10 of this report.

4 COAL LOSSES BY WIND FROM UNTREATED CARS

Early in the study it became evident that the loading profile, that is, the geometrical configuration of the exposed surface of the coal, had a large influence on the coal lost in transit (Plate 1). Beshketo[2] reported heavy losses of coal at high train speeds. According to his data, the best "hood" height, based on car capacity and winds losses, is 200 mm (8") above the sill of the coal cars (Figure 2). He observed that 6 mm of coal was lost at 60 km/h (40 mph) and 13 mm (1/2") lost at 100 km/h (approx 60 mph). A parallel study on dust losses from mineral concentrates was carried out by Schwartz.[5] He observed

that losses from concentrates were up to 2.1% for speeds up to 60 mph.

Screen analyses of the various coals transported to British Columbia terminals are presented in Figure 3. Even though the coal from Alberta is somewhat coarser than the coal from British Columbia, both types readily become airborne at low speeds.

Exact measurements of coal losses during transportation were difficult to determine with a high degree of confidence. Some problems experienced during the study included: inconsistencies in weigh scale calibration, variations of existing moisture content of the coal, addition of flying debris deposited in cars en route, and the inclusions of rain and/or snow. Thus calculations of coal lost en route as a measurable difference between car weight at the departure point and its weight at the terminal were somewhat unreliable.

Previous studies[2 and 3] suggest losses in the order of 1.5 tons/car or 1.5% for a 100-ton car capacity. Even if we assume that losses of western coal are only 0.5% or 1/2 ton/car per 700 mile journey, it is relatively easy to justify a reasonable expenditure to keep coal in the cars and, at the same time, reduce public concern over pollution.

In economic terms, prevention of the assumed Western Canada coal losses represent a saying, based on $60/ton of $30/car or over $3 million annually.

5 LOADING PROFILE

5.1 Effects on Crust Retention During Transit

Loading profiles had a profound influence on crust retention (Plates 1, 2). A surface particle is affected by the vertical force of gravity and by horizontal forces of linear and centrifugal acceleration

and/or deceleration. The magnitude of each component depends on whether the particle rests on a horizontal surface or on an inclined plane and on the resistance to shear offered by the substrate. Furthermore, if the independent particle is chemically bound to other surface particles, the strength of the chemical bond is an additional force that increases the particle's resistance to sliding.

During the field tests it was soon realized that a totally flat surface would produce the most desirable profile (Plates 3, 4). Coverage of the flat portion of the car never presented a serious problem, suggesting that the effects of acceleration and deceleration of the train were negligible compared to the resistance offered by the substrate. The only evidence of failure was the appearance of surface cracks induced by torsional and vibrational stresses to which the cars were subjected during transportation.

5.2 Influence of Loading Method

In practice, the operation of a single loading chute always produced a sloped end at each end of the car (Plates 5, 6). On these slopes, the larger the horizontal component of the opposing force the more stable the system became. At the natural angle of repose where all forces were in balance, any minor disturbance due to acceleration or deceleration of the cars was sufficient to cause failure. To increase crust stability the angle of repose would be decreased at least by the expected maximum acceleration or deceleration of the cars. If this cannot be achieved, then, the strength of the chemical bond within the binder must accommodate the impact of these accelerations plus any torsional or vibrational components.

6. CHEMICAL BINDERS EVALUATED IN PHASE I

A chemical spray is more effective if it shows an affinity for the material on which it is sprayed and if the product (eg. coal) does

not slump after the application (Plate 10). Coal readily absorbs oils without any prior surface treatment (lipophilic property) but repels water (hydrophobic property). In the case of emulsions, where water is the continuous phase, wetting of the surface can occur only if the surface has been pretreated with a solution containing a surface-active agent, or if there are sufficient quantities of a fast acting surfactant within the formulation.

Papic and McIntyre[4] tested 83 surfactants to evaluate their ability to improve the wetting of coal by water. Their findings showed that nonionic surfactants of the alkyl-phenylpolyethoxy ether type were the best wetting agents.

During the study the following chemical binding products, with or without the addition of specific surfactants, were tested:

(a) Dowel M167, a latex product by Dowell of Canada.

(b) Alchem 63026, a latex product by Alchem Limited.

(c) Dust Suppressant 100, an asphalt emulsion produced and marketed by Pounder Emulsions Limited.

(d) Dust Suppressant 200, an emulsified petroleum residue produced and marketed by Pounder Emulsions Limited.

(e) Acquatain, a product marketed by Whitlock Construction.

(f) Lignin Derivatives, an experimental product by Cominco.

(g) Coal Spray 100, an oil preparation by Imperial Oil Limited.

(h) Reclamation Oil, a product tested by Cominco.

6.1 Oil and Emulsion Test Results and Comments

Oil sprays and emulsions were the most effective binders (Plates 7, 8, 9). The success of the binders was attributed to the production of a flexible crust, high viscosity and an inherent ability to regenerate their surface. In other words, the stability of the product prevented the formation of a rigid crust by reacting neither with the coal particles nor with the atmosphere. The cohesive forces of the oil phase were enhanced by the lipophilic character of the coal which facilitated spreading of the oil on the coal surface. In this case the oil-coated particles adhered to each other forming a porous and oozy top layer. The same mechanism was operative in regenerating the top layer of the crust whenever a surface crack was produced by vibrational and/or torsional movement of the cars or by settling of the coal. The oils and emulsions were the only products to display this regenerative property.

Some of the disadvantages of using oils included the adverse effects on rubber conveyor belts and the possibility of washing residual oil and/or additives into adjacent water bodies.

Tables 3, 4, 5 and 6 present a summary of the detailed analysis and results of oil and emulsion tests obtained by each participant and previously recorded on Visual Observation Forms - Phase I (See Table 2).

Table 3 shows results for Coal Spray 100; Table 4, Reclamation Oil; Table 5, Dust Suppressant 100; and Table 6, Dust Suppressant 200.

Table 11 is an overall summary based on the best tests from the above tables, and includes the rating and the degree of acceptability of all the products.

6.2 Other Binding Products, Test Results and Comments

The main disadvantage of latex is its brittle crust. Vibra-

tional and torsional movements cracked the surface polymer and patches of polymerized latex were easily removed or displaced by wind (Plate 2). Adherence of the crust to the substrate was minimal, and therefore, the best retention occurred on horizontal surfaces (Plates 10, 11, 12). Because the well polymerized and chemically stable crust of latex products is not water soluble, leaching is unlikely to take place, and therefore, pollution of adjacent water bodies will not occur.

Lignin derivatives, which are strong wetting agents, formed a thick crust which will dissolve readily in water. Following excess rainfall, the lignin derivatives were transported into the bulk of the coal in the cars, and the remaining washed unconsolidated coal behaved as untreated coal in that coal dust became airborne.

Tables 7, 8, 9 and 10 present a summary of the detailed analysis and results of latex and Lignin Derivatives products obtained by each participant and previously recorded on Visual Observation Forms - Phase I (see Table 2). Table 7 shows results for Dowell M167; Table 8, Lignin Derivatives; Table 9, Aquatain; and Table 10, Alchem 63026. Table 11 is a summary based on the best tests from the above tables, and includes the rating and the degree of acceptability of all the products.

7 SPRAYING METHODS

The difficulties of retaining a crust on the surface slopes necessitated an investigation of spraying techniques. Two mechanical techniques were tried: (a) preferential spraying, and (b) a combination of flooding and spraying.

Preferential spraying is the uneven application of chemical binders to different parts of the exposed surface (Plates 13, 14, 15). The slopes were sprayed more than the horizontal surfaces. This technique has been used with moderate success and will continue to be applied when fast and complete wetting can be achieved without binder run-off.

To increase binder retention on slopes, Fording Coal Ltd. devised a penetration-spray system designed to achieve not only maximum penetration and thickness but also an adequate surface coverage (Plates 17, 18). The system employs an oscillating spray bar equipped with nozzles capable of open-orifice discharge and fan spraying. The open-orifice discharges are designed to prevent run-off of the emulsion and the formation of a thick crust by increasing binder penetration. The fan sprays are designed to provide a more uniform and adequate coverage of the surface layer. Using this system, Fording Coal Ltd. demonstrated that undesirable slopes could be stabilized almost entirely (Plates 19, 20).

8 SPRAYING REQUIREMENTS

The major coal companies operating in Western Canada, in direct response to public concern about the coal dust pollution problem and their agreement with the findings of this report, volunteered to apply reasonable measures to control the coal dust emanating from moving trains. As of July 1, 1974, all major mining companies sprayed every train leaving their property.

Unfortunately, not all of the chemical binders offered adequate protection. Industrial and Federal representatives agreed that the single parameter that best describes the effectiveness of the various chemical binders is the residual surface coverage measured at the terminals. Assuming that coal dust originates uniformly from every part of the exposed surface, then effective surface coverage is the only parameter that is directly proportional to the coal dust generated in transit.

The mining companies agreed with the standards presented in Phase I of this report that a minimum of 85% of the surface would be covered immediately and furthermore, that a 90% coverage should be achieved by October 1975.

9 PHASE II FIELD MONITORING

Sections 9 and 10 present a synopsis of the B.H. Levelton and Associates' study. The spraying techniques and methods of crust retention observation and recording were founded on the basis of the Phase I work. In the Levelton study, the range of tests were extended to include complete unit train protection and to assess the coverage resulting from mine optimization of chemical binder required to produce an 85% cover. Table 12 shows the number of trains and cars monitored.

9.1 Coal Shipments

All unit trains originating from western mines consist of open-top rail cars, but the size of cars varies not only between the two major railway companies but also within the same company.

The most common car size used by CP Rail is 48-ft long, 12-ft high and 10-ft wide. Cars from CN Railway are 50-ft long, 10-ft high and 10-ft wide.

Unit trains from Alberta to Vancouver cover a distance of approximately 700 miles at a maximum speed of 45 mph. Coal trains from British Columbia cover approximately the same distance but are allowed to travel at 50 mph.

9.2 Loading Profiles

The total surface profile of the coal cars comprized three distinct sections: a front slope, a central flat area and a rear slope. Typical longitudinal profiles showing slope lengths, slope angles, flat lengths and cross-sectional profiles are shown in Figure 4. The total exposed area, therefore, is comprised of the area along the two slopes plus the flat area.

9.3 Measurements of Surface Coverage

Initially, the areas of both front and rear slopes and the levelled area in the centre were measured in several cars from each of four mining companies. Later, a "trained observer" was exposed repeatedly to measured and observed sections of the cars in order to eliminate unnecessary measurements and costly slow-down procedures at the terminals. Measured and estimated percentages of the front slope, middle surface and rear slope were recorded on a pre-printed "Coal Car Coating Inspection" form (See Figure 5). From these individual area measurements, the extent of crustal cover remaining intact at the Vancouver terminal was calculated as a percentage of the total original coal surface. At the same time, a summary sheet was prepared. This summary included data on:

- Terminal
- Coal origin
- Train number
- Times train left origin and arrived at terminal
- Binder used
- Weather during treatment, during transit and during observation
- Number and location (in train) of cars inspected
- Nature of crust cracks, crust loss and crust character
- Abnormalities in profile
- Special observations
- Percent coverage
- Percent coverage on total coal surface.

In addition, colour photographs were taken of about 220 coal cars. See Plates 21 to 24 for typical photographic recordings.

10 PHASE II MONITORING RESULTS

10.1 Crust Retention Calculations

The number of cars and their respective coverage expressed in percent of total surface area have been tabulated for each mine in Tables 13, 14, 15 and 16. These data have been rearranged below to show the frequency distribution for total cover remaining as a percentage of coal cars inspected.

COVER REMAINING (%)	MINE B (%)	MINE C (%)	MINE A (%)	COVER REMAINING (%)	MINE D (%)
0-50	2.6	6.6	0	0-40	5.0
51-55	0.5	0.9	0	41-45	7.5
56-60	1.0	1.0	1.2	46-50	7.5
61-65	2.1	2.4	0	51-55	22.5
66-70	1.0	9.0	2.5	56-60	25.0
71-75	10.0	14.2	9.9	61-65	25.0
76-80	11.6	18.4	14.8	66-71	7.5
81-85	21.6	16.5	30.9		
86-90	26.3	17.0	21.0		
91-95	17.9	10.4	19.8		
95-100	5.3	3.3	0		

The frequency distribution of total cover remaining is shown graphically in Figure 6. The most frequently occurring coverage within a 5% interval is 86-90% for Mine B, 76-80% for Mine C, 81-85% for Mine A and 61-65% for Mine D.

10.2 Crust Retention on Front and Rear Surface Slopes

The percentage of cover remaining on front and rear slopes for coal shipped from Mines A, B, C and D and is tabulated in Table 17. This frequency distribution has been plotted for 10% intervals in Figures 7, 8, and 9. The most effective coverage observed resulted from levelling the front slope of the cars at the loading site of Mine B. Levelling increased surface crust retention by an average of 40% when compared to Mines A and C.

11 NEW LOADING TECHNIQUES AND CHEMICAL PRODUCTS FOR COAL DUST CONTROL

Since September 1976 all coal mines shipping to British Columbia terminals have adopted a modified method of loading and spraying unit trains.

New and more capable loading (eg. Plate 16) chutes have improved the loading profile, increased dust control and have reduced considerably the total loading time for the unit train. In addition, the operator can more effectively control the total tonnage carried by each car thus fewer variations in the total carrying capacity occur when cars are loaded to the allowable limit. The net result is a substantial saving of time and money.

Encouraged by the potential savings in coal losses and by required environmental controls, many companies in the U.S.A. and Canada are developing new chemical products to equal or better the performance of the products tested in this report.

Coverages approaching 100% can be expected by the end of the 1970's.

12 REFERENCES

1. Report 2382 - Coal Dust Study - Roberts Bank, B.C. Research, Vancouver, B.C.

2. V.K. Beshketo, "How to Reduce the Loss of Coal when Transported at High Speeds", Zheleznodorozhni Transport, p. 27, October 1964.

3. G.H. Denton et al, "Minimization of In-transit Windage Losses of Olga Low Volatile Coal", 1972 Coal Show, American Mining Congress, Cleveland, Ohio.

4. M.M. Papic and A.D. McIntyre, "Surface Active Agents in Coal Dust Abatement", p. 85, Coal Age, June 1973.

5. P.L. Schwartz, "Innovations in Railroad Transportation of Mineral Products", Paper presented at the Second International Symposium on Transport and Handling of Minerals, Rotterdam, Netherlands, October 1-6, 1973.

TABLE 1

MOVEMENT OF COAL TO BRITISH COLUMBIA TERMINALS DURING 1973

SHIPPER*	FROM	TO	COAL TRANSPORTED (Short Tons)
CPR	Elkview	Delta	4,847,530
CPR	Fording	Delta	2,464,740
CPR	Coleman	Port Moody	867,497
CPR	Canmore	Port Moody	200,249
CNR	Winniandy	Vancouver	1,658,251
CNR	Luscar	Vancouver	1,265,272

* CPR - Canadian Pacific Railway
  CNR - Canadian National Railway

TABLE 2

VISUAL OBSERVATION FORM - PHASE I

Participant _____ Spraying date _____

Product tested _____ Spraying location _____

Test No. _____ Type of coal _____

Train No. _____ Test rated by _____

Car No. / Parameter		Weather	General Crust Appearance	Crust	Binder Penetration (inches)		Condition of Fines		Remarks
					Top	Sides	Crust	Cracks	
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								

LEGEND:

(H) homogeneous (F) friable
(C) crushed (B) brittle
(P) patchy (T) tough
(N) nodulized

(U) unconsolidated
(C) consolidated

TABLE 3

Imp Oil Ltd

TEST RESULTS AND SUMMARY: COAL SPRAY 100

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Kaiser	20	100	Good coverage up to 30 gal/car.
	30	100	
	45	100	Excellent coverage above 45
	60	100	
	70	100	gal/car.
Foraing	40	100	Very homogeneous coverage. Some
	50	100	
	60	100	evidence of blowing. Good
	70	100	
	80	100	results.

TABLE 4 Continued

TEST RESULTS AND SUMMARY: RECLAMATION OIL

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	25	100	Good coverage on slopes.
Fording	50	100	Very good. Minor exposure of ends.
Fording	30	100	Soft crust. Good ends.
Fording	30	100	Good coverage. Minor exposure of ends.

TABLE 5

TEST RESULTS AND SUMMARY: DUST SUPPRESSANT 100

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	70	30	Good crust. Fair results.
Ft. Steele	75	15	Tough crust. Poor spraying. Good results.
Ft. Steele	45	25	Good crust. Good results.
Ft. Steele	70	10	Brittle to tough crust. Evidence of blowing.
Kaiser	50	5	Homogeneous, brittle to tough. Good coverage.
Kaiser	120	15	Fair to good. Evidence of blowing.
Kaiser	50	25	Good crust. Excellent results.
Fording	50	15	Homogeneous crust. Ends blown. Poor to fair results.
Fording	50	15	Homogeneous crust. Ends blown. Poor to fair results.
Fording	108	10	Homogeneous, poor slopes.
Fording	62	15	Consolidated crust. Slopes partly exposed.

TABLE 6 Dust Sup 200

TEST RESULTS AND SUMMARY: DUST SUPPRESSANT 200

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	90	15	Homogeneous crust. Exposed ends.
Fording	60	15	Soft crust. Minor exposure of ends.
Fording	50	15	Good coverage on improved profiles.

TABLE 7

TEST RESULTS AND SUMMARY: DOWELL M167

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	24	9.0	Friable to brittle crust. Fair.
Ft. Steele	60	10.0	End erosion by wind. Fair.
Ft. Steele	25	5.0	Friable crust. Poor penetration.
Ft. Steele	42	5.0	Thicker crust. Fair to good.
Ft. Steele	43	5.0	Patchy. Wind erosion. Poor.
Kaiser	65	7.5	Good coverage. Fair to good results.
Kaiser	40	7.5	Good appearance. Good results.
Kaiser	40	10.0	Brittle to tough crust. Fair.
Fording	40	7.5	Rain had detrimental effect. Poor.
Fording	55	7.5	Brittle crust. Fair results.
Fording	60	5.0	Friable crust. Wind erosion. Poor.

TABLE 8

TEST RESULTS AND SUMMARY: LIGNIN DERIVATIVES

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	50	8	Crust thickness up to 3".
Fording	60	8	Evidence of blowing at both
Fording	70	8	ends. Fair results.
Fording	80	8	
Fording	72	8	Brittle crust. Poor ends.
Fording	80	8	Fair coverage on slopes.
Fording	60	8	Excessive exposure on poor profile.

TABLE 9

TEST RESULTS AND SUMMARY: AQUATAIN

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	32	12.5	Weak, friable crust. Slopes exposed.
Ft. Steele	45	14.2	Friable crust. Wind erosion. Poor.
Ft. Steele	18	20.0	Patchy, friable crust. Poor.
Ft. Steele	40	14.3	Patchy crust. Ends eroded.
Ft. Steele	40	33.0	Evidence of blowing. Poor.
Kaiser	32	Not reported	Thin, friable. Poor results.
Kaiser	36		Improved crust. Poor to fair.
Kaiser	23		Friable crust. Poor to fair.
Fording	73	6.6	Homogeneous thin crust. Fair.
Fording	60	6.6	Sides blown. Poor results.
Fording	60	6.6	Thin and friable crust. Ends eroded.

TABLE 10

TEST RESULTS AND SUMMARY: ALCHEM 63026

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	27	7.2	Friable, inadequate coverage. Poor.
Ft. Steele	27	5.4	Thin crust, excessive wind erosion. Poor.
Ft. Steele	26	3.8	Extremely poor. Little or no crust.
Ft. Steele	27	3.0	Much evidence of blowing. Poor.
Ft. Steele	30	1.6	Poor results on poor profiles.
Kaiser	27	3.8	Thin, friable crust. Much blowing.
Kaiser	27	11.0	Improved crust. Still unacceptable.
Fording	30	4.0	Patchy, friable crust. Poor.
Fording	40	10.0	Slight improvement. Still very patchy.
Fording	26	6.2	Thin and friable. Poor.

TABLE 11

RATING AND ACCEPTABILITY OF CHEMICAL BINDERS
BASED ON COMPARISON TESTS OF BEST PERFORMANCES

(Derived from Tables 3 to 10)

BINDER	VOLUME (Gal.)	CONCENTRATION (%)	GALS/CAR	RATING	ACCEPTABILITY
Coal Spray 100	45	100.0	45.0	1	Best performance on
Reclamation Oil	50	100.0	50.0	2	all profiles.
DS 100	50	25.0	12.5	3	Effective on flat pro-
DS 200	50	15.0	7.5	4	files and slopes.
Dowell M167	65	7.5	4.9	5	Effective on flat
Lignin Derivative	60	8.0	4.8	6	profiles.
Acquatain	73	6.6	4.8	7	Unacceptable.
Alchem 63026	40	10.0	4.0	8	

TABLE 12

NUMBER OF TRAINS AND CARS MONITORED DURING PHASE II FIELD WORK

SOURCE	NO. OF TRAINS	TOTAL CARS	CARS/TRAIN (Average)	LOCATION IN TRAIN
Kaiser	12	211	17.6	Front 3 trains Centre 4 Rear 4 All cars 1
Fording	10	215	21.5	Front 6 trains Centre 1 Rear 2 All cars 1
Luscar	4	79	19.7	Front 1 train Centre 1 Rear 2
McIntyre	4	42	20.0 (2 trains) 1.0 (2 trains)	

TABLE 13

MINE B

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	432	434	436	444**	446**	448**	450	457	460	463	468	TOTAL
DATE	Aug 31	SEP 3	4	7	9	10	11	15	17	18	19	
NO CARS	10	18	20	20	13	28	20	20	20	20	2	211
LOCATION	R	C	C	C	R	All	F	C	F	F	R	
WEATHER	CI	OW	SW	SW	SW	SW	SW	R	SW	SW	SW	
COAL							WET	WET	WET			
PERCENT												
98		5[a]										5
97												
96		5										5
95		5							4			9
94										2		2
93								2	3	1		6
92		1						1		4		6
91		1		1					1	8		11
90			1	3		3	2		5	1		15
89			1	2				1	1			5
88			5	1	1		1	1	1	2		12
87						2		4				6
86			3	2	1		2	2	1	1		12
85			2	4		1	2	3	1		2	15
84			3	1	1		1					6
83					1	2		1				4
82			1		1	3	2	1				8
81			1		2	1	2	2				8
80				1		2			2	1		7
79					2							2
78					1	1	1					3
77						1	2					3
76	1			1	2		3					7
75				1		4	1		1			7
74	1					4	1					
73												
72			2			2						4
71	1					1						2
70					1							1
69												
68				1								1
	(63) 1	(50) 1	(65) 1	(65) 1		(63) 1	(63) 1					
	(59) 1						(60) 1					
	(54) 1											
	(39) 1											
	(38) 1											
	(36) 1											
	(23) 1											

**Binder is "modified" latex.

Footnote: a. The number of cars with percentage cover as shown.

TABLE 14

MINE C

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	821249	821254	821257	821261	821262	821263	821269	821270	821271	821273	Total
DATE	Aug 29	Sept 1	Sept 5	Sept 8	Sept 9	Sept 9	Sep 16	Sep 16	Sep 17	Sep 19	
NO. CARS	44	24	22	20		22	22	24	25	12	
LOCATION	All	F	F	F*	F	F*	F*	R	R	C	
WEATHER	SW	OW	SW	SW	SW	SW	OW	OW	SW	SW	
COAL PERCENT											
97	1										1
96	1		2						2		5
95									1		1
94	6								1		7
93	4								2		6
92	1								2		3
91	3							1	1		5
90	1		1					1	1		4
89	3		1	1					1		6
88	3						1	1	4		9
87	2					2		2	3		9
86	1			1		1		2	2	1	8
85	1		1	1		3	1	1		1	9
84	2						1	2			5
83	1	1	2				1	2	1	1	9
82			1			2		1			4
81			1	2		2	1	1	1		8
80				2		3		1			6
79	2	1	2	1				2		1	9
78	3	2	1	1		2	1			1	11
77	1		1	2			1				5
76	2	1				2				3	8
75						1	2		1	2	6
74	2			1			1	1		1	6
73	2		2	2		1	1				8
72		1		1		1	1	1			5
71			1			1	1	1		1	5
70			1			1	1				3
69		1	1	1			1				4
68		2	1				4				7
67		3					1				4

PART INSPECTED WAS NOT COATED

*Night train

SW = Sunny and warm; OW = Overcast and warm; Cl = Cloudy
R = Rain. F = Front; R = Rear; C = Centre.

TABLE 14 (CONTINUED)

MINE C

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	821249	821254	821257	821261	821262	821263	821269	821270	821271	821273	Total
DATE	Aug 29	Sept 1	Sept 5	Sept 8	Sept 9	Sept 9	Sep 16	Sep 16	Sep 17	Sep 19	
NO. CARS	44	24	22	20		22	22	24	25	12	
LOCATION	All	F	F	F*	F	F*	F*	R	R	C	
WEATHER	SW	OW	SW	SW	SW	SW	OW	OW	SW	SW	
COAL											
				(66) 1			(65) 1	(65) 1			
							(64) 1				
								(63) 1			
				(62) 1							
		(60) 1	(60) 1								
	(59) 1										
		(57) 1									
		(55) 1									
		(53) 1									
								(48) 1			
		(43) 1									
		(39) 1									
									(38) 1		
			(36) 1	(36) 1							
				(35) 1							
		(29) 1									
		(23) 1									
								(21) 1			
		(20) 1	(20) 1								
		(0) 2									

*Night Train.

TABLE 15

MINE A

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	L151*	L154	L158	L160	TOTAL
DATE	Aug 28	Sept 3	Sep 14	Sep 16	
NO. CARS	19	20	20	20	
LOCATION		C	R	R	
WEATHER	R	SW	SW	SW	
COAL PERCENT					
94				1	1
93	1	1	1	3	6
92				4	4
91			1	3	4
90		1		3	4
89	1			4	5
88					
87	1	1			2
86	2	1	3		6
85	2			1	3
84		4	3	1	8
83		3			3
82	3	1	5		9
81	1	1			2
80			1		1
79	1				1
78	1	2	2		5
77	1		1		2
76		1	2		3
75	1	2			3
74					
73		1			1
72	3	1			4
71					
70					
69					
			1		1

*Night train.

TABLE 16

MINE D

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	M380	M381*	M388	M389	TOTAL
DATE	Sep 9	Sep 10	Sep 22	Sep 23	
NO. CARS	18	22	1	1	
LOCATION	F	F-W			
WEATHER	SW	SW			
COAL					
PERCENT					
71	1				1
70		1			1
69		1			1
68					
67					
66					
65					
64	1	1			2
63	3	1			4
62	1				1
61	1	1			2
60				1	1
59	1	2			3
58		2			2
57	2	1			3
56	2				2
55		1			1
54	1				1
53	2	1			3
52	1	1			2
51		2			2
50		1			1
49	1		1		2
48					
47	1				1
46					
45		1			1
44					
43		1			1
42		1			1
30		1			1
0					1

*Night train

TABLE 17

FREQUENCY OF COVERAGE ON

FRONT AND REAR SLOPES

Percent Cover	Kaiser		Luscar		Fording	
	Front	Rear	Front	Rear	Front	Rear
0	1	16	1	13	9	10
5	-	2	-	-	1	-
10	2	14	1	4	19	3
15	-	-	-	1	1	-
20	2	10	1	5	13	6
25	-	5	3	-	3	-
30	-	9	10	4	15	14
35	1	6	1	1	2	-
40	-	18	6	10	23	23
45	-	1	1	1	-	1
50	8	14	16	21	20	32
55	-	1	2	-	-	2
60	5	14	14	14	34	31
65	-	1	2	3	-	3
70	4	11	12	1	27	11
75	1	7	3	2	5	10
80	13	18	4	2	16	18
85	9	9	-	-	2	10
90	42	15	1	1	10	13
95	14	9	-	-	6	15
95+	6	3	-	-	-	9
100	22	8	-	-	-	2

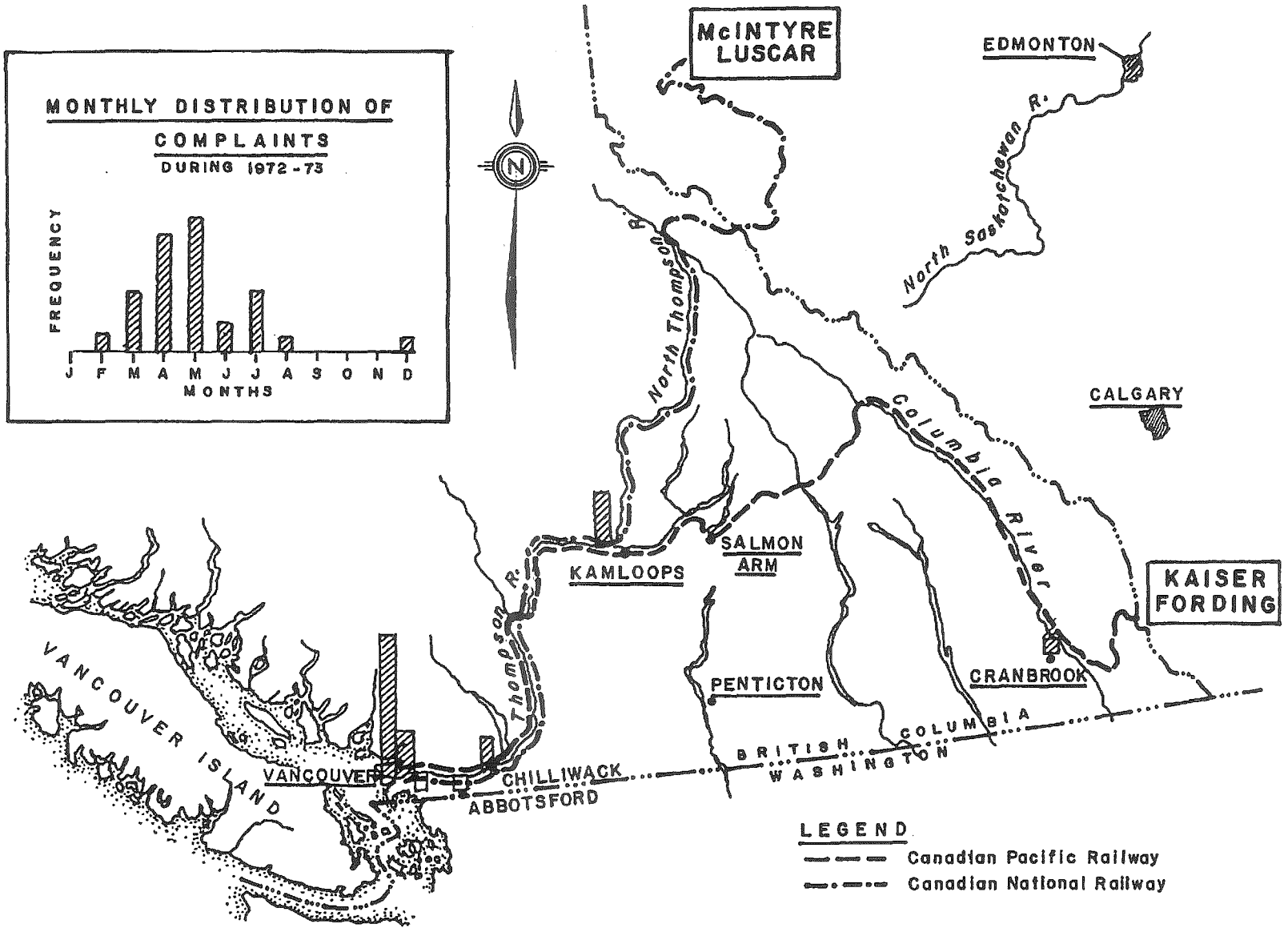


FIGURE 1 REGIONAL DISTRIBUTION OF COMPLAINTS DURING 1972 - 1973

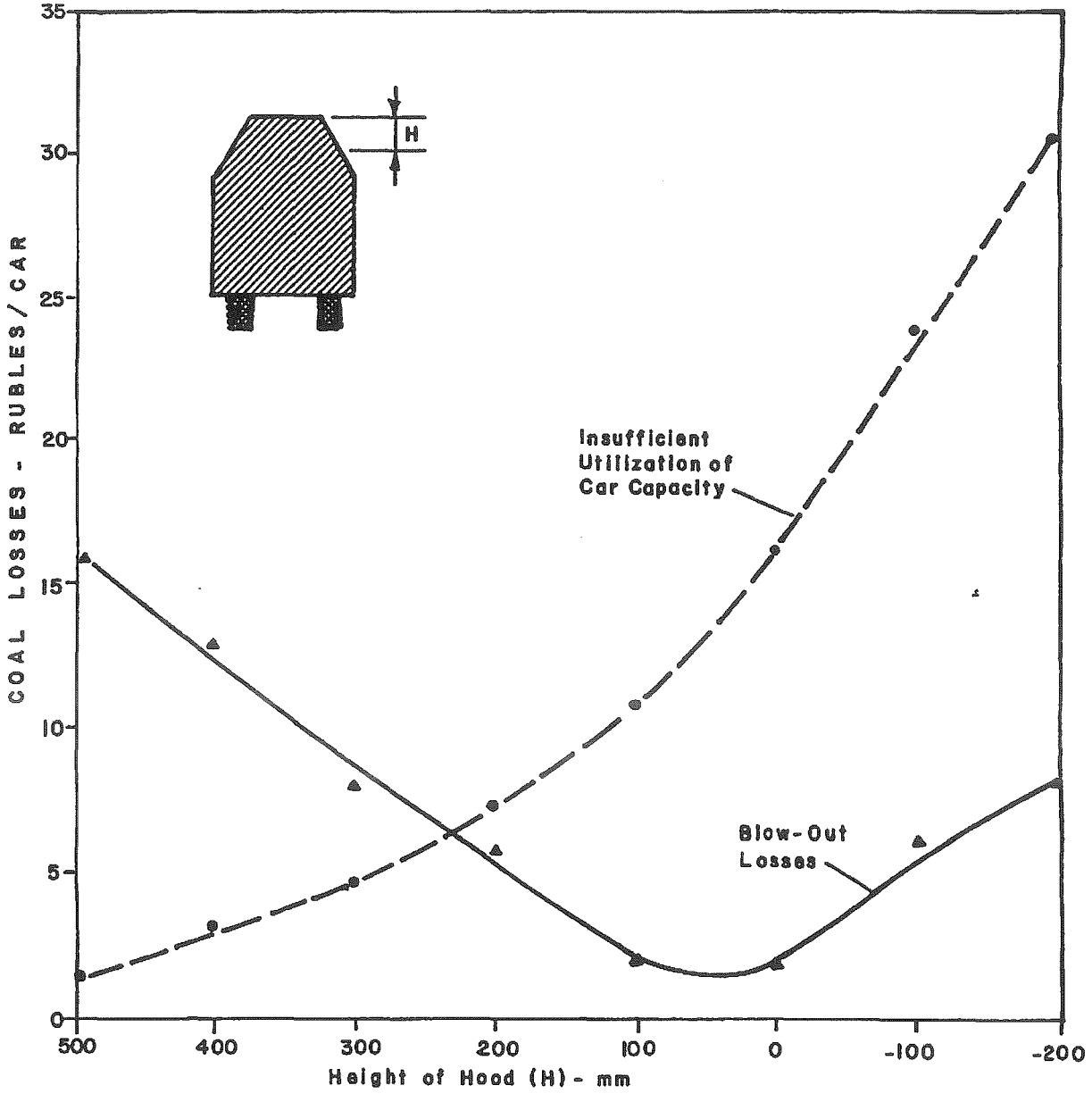


FIGURE 2 COAL LOSSES OF HIGH SPEEDS
(After V.K. Beshketo)

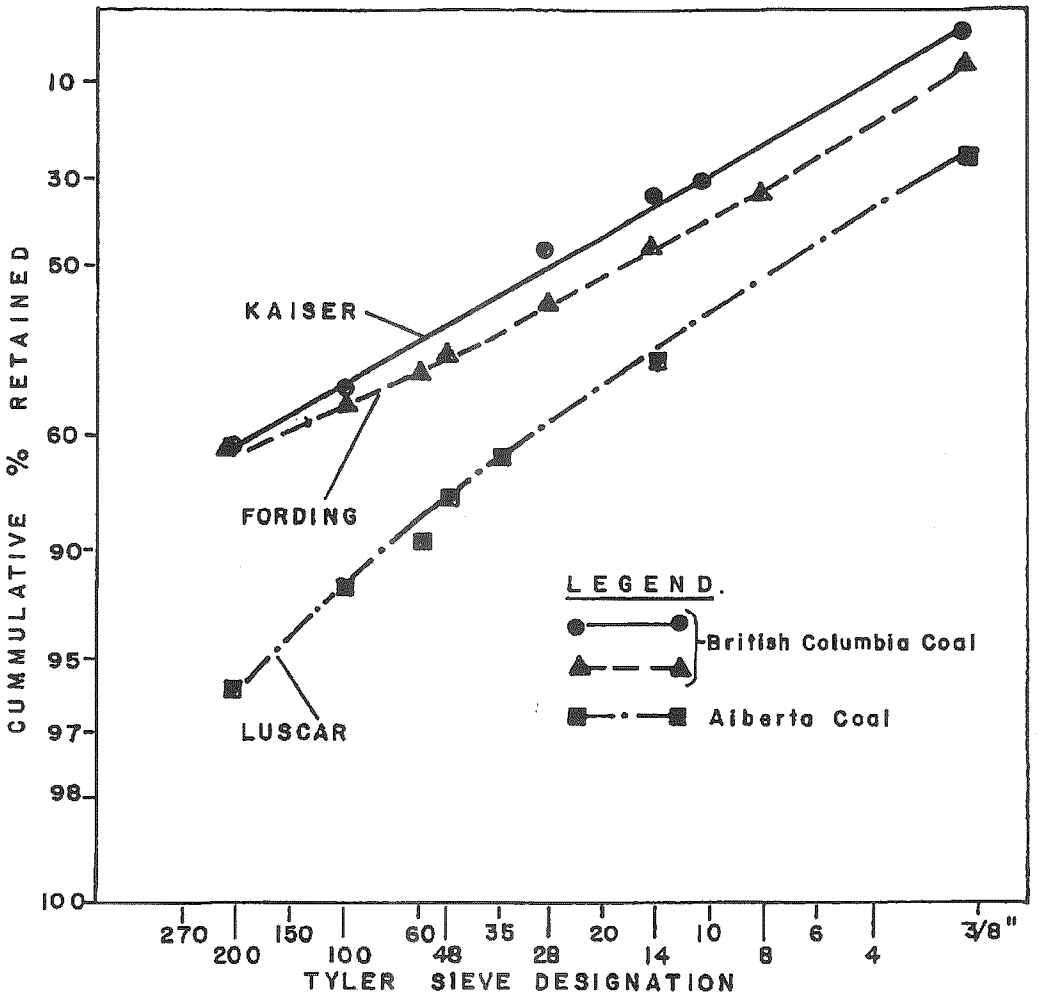


FIGURE 3 COMPARATIVE SCREEN ANALYSIS OF BRITISH COLUMBIA AND ALBERTA COALS

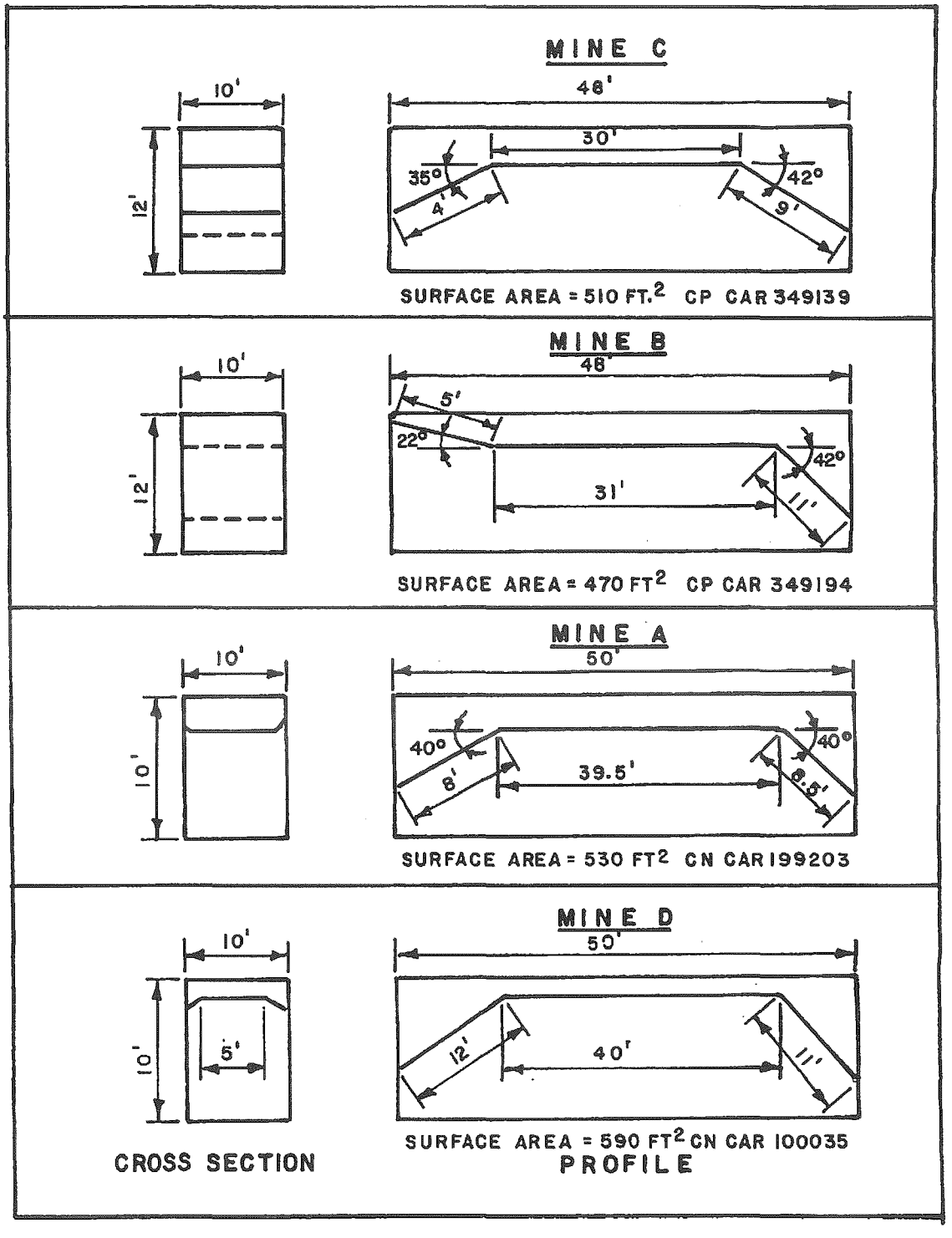


FIGURE 4 TYPICAL COAL CAR SURFACE DIMENSIONS -
(From Levelton & Associates Ltd.)

B. H. LEVELTON & ASSOCIATES LTD. 1755 WEST 4TH., VANCOUVER, B.C. V6J 1M2 PHONE 736-6516

COAL CAR COATING INSPECTION

Terminal _____ Date Treated _____ Origin _____

Photo No. _____ CP/CN Train No. _____

Inspector _____ Date Examined _____ Car No. _____

Time _____ Binder _____

Weather - During Treatment _____ During Trip _____ On Arrival _____

	FRONT	FLAT	REAR	TOTAL
% Coverage				
Condition				
Dust Escapement Evidence				
Crust Flexibility				
Crust Thickness				
Crust Failure Nature and Prevalence				
Incomplete Coverage				

Terminal _____ Date Treated _____ Origin _____

Photo No. _____ CP/CN Train No. _____

Inspector _____ Date Examined _____ Car No. _____

Time _____ Binder _____

Weather - During Treatment _____ During Trip _____ On Arrival _____

	FRONT	FLAT	REAR	TOTAL
% Coverage				
Condition				
Dust Escapement Evidence				
Crust Flexibility				
Crust Thickness				
Crust Failure Nature and Prevalence				
Incomplete Coverage				

FIGURE 5

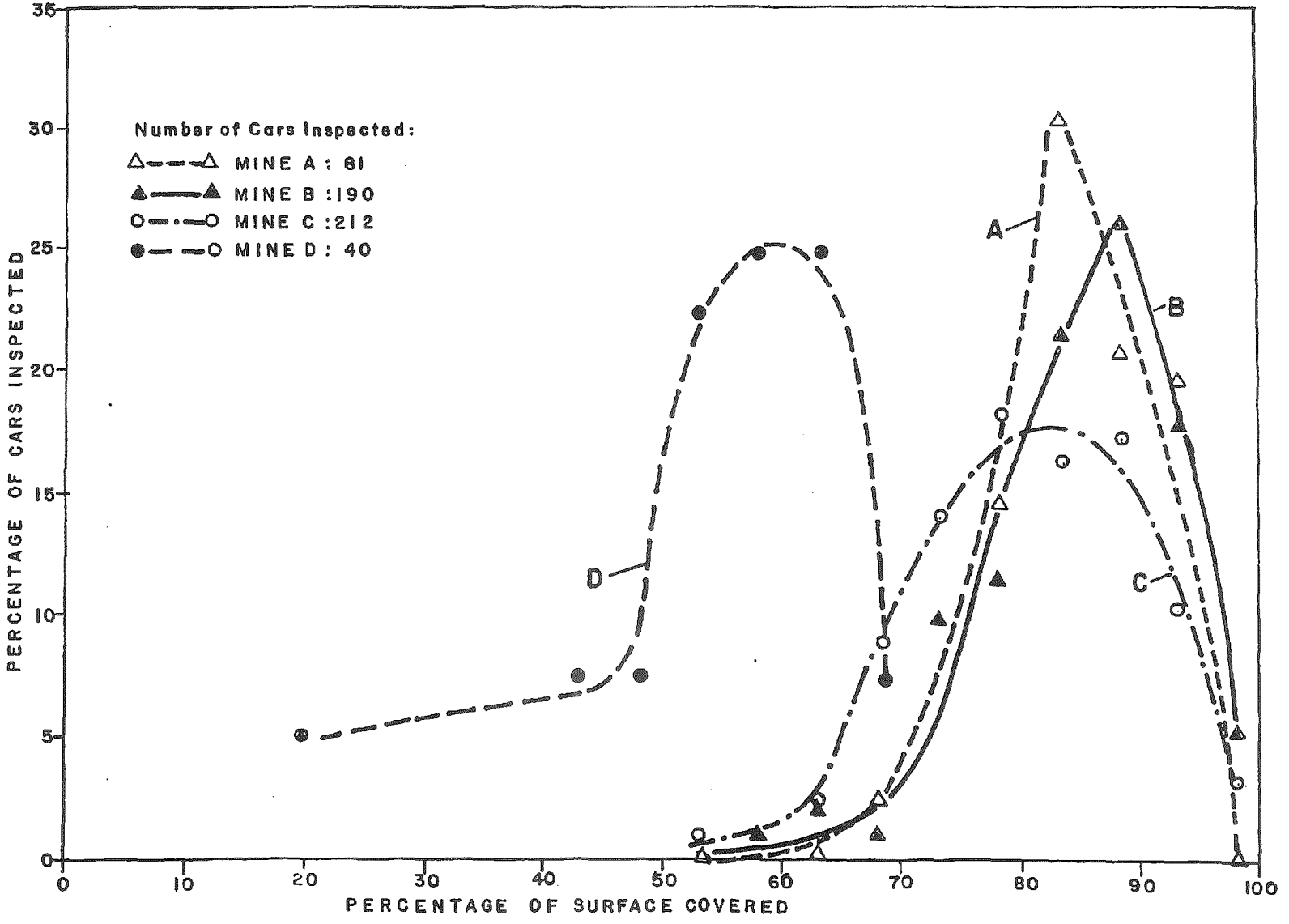


FIGURE 6 DISTRIBUTION OF COVER REMAINING ON TOTAL SURFACE OF COAL CARS

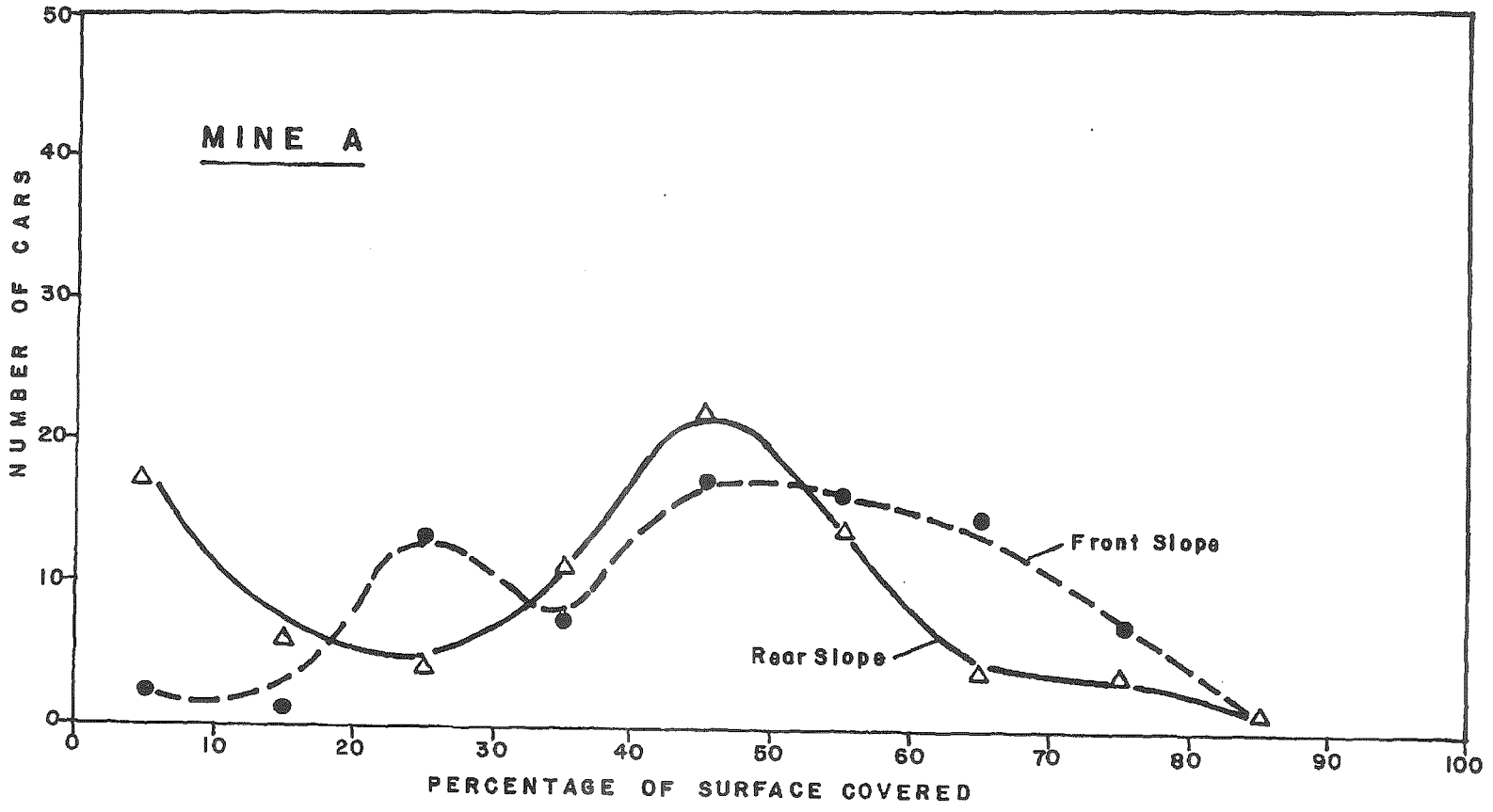


FIGURE 7 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

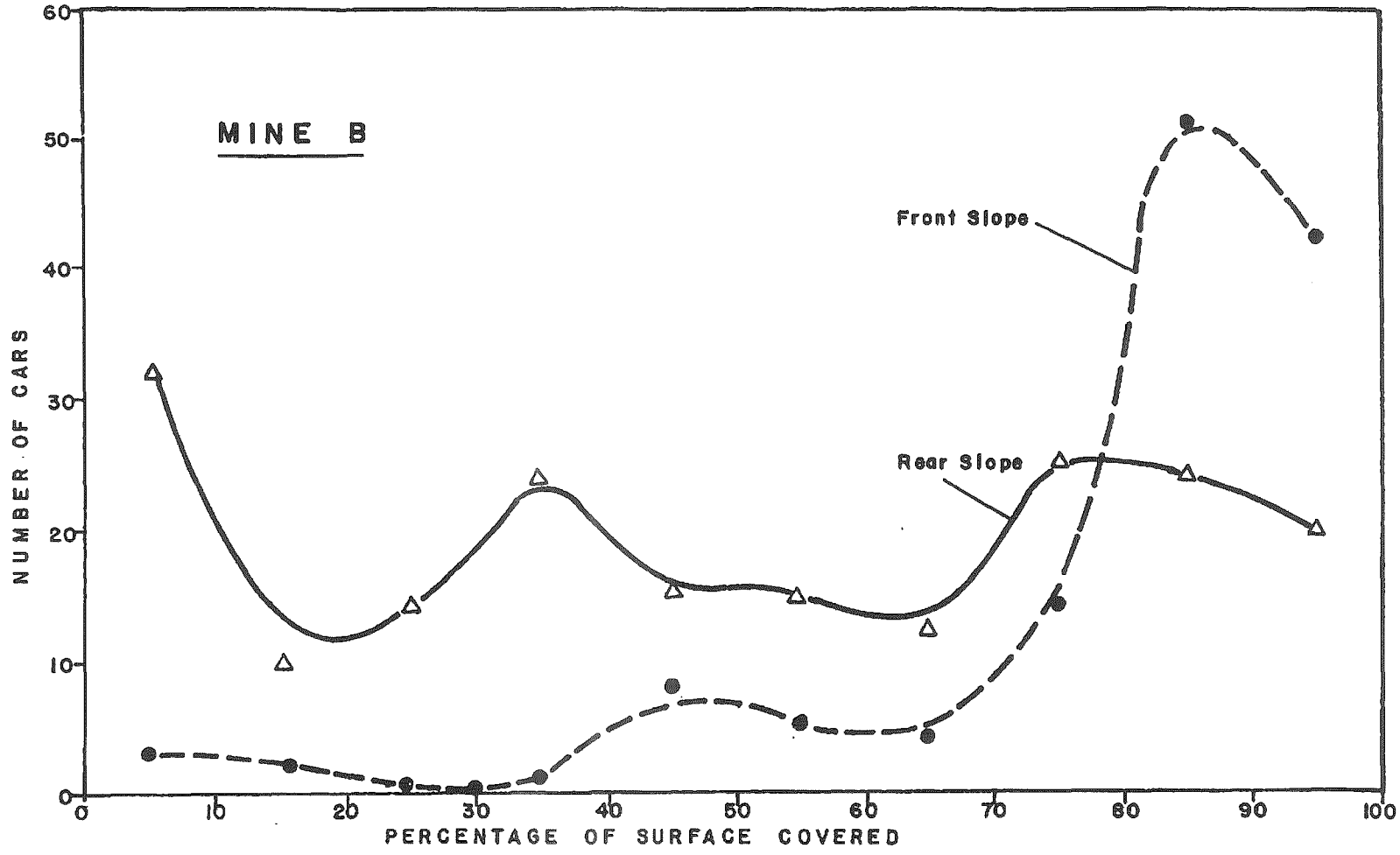


FIGURE 8 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

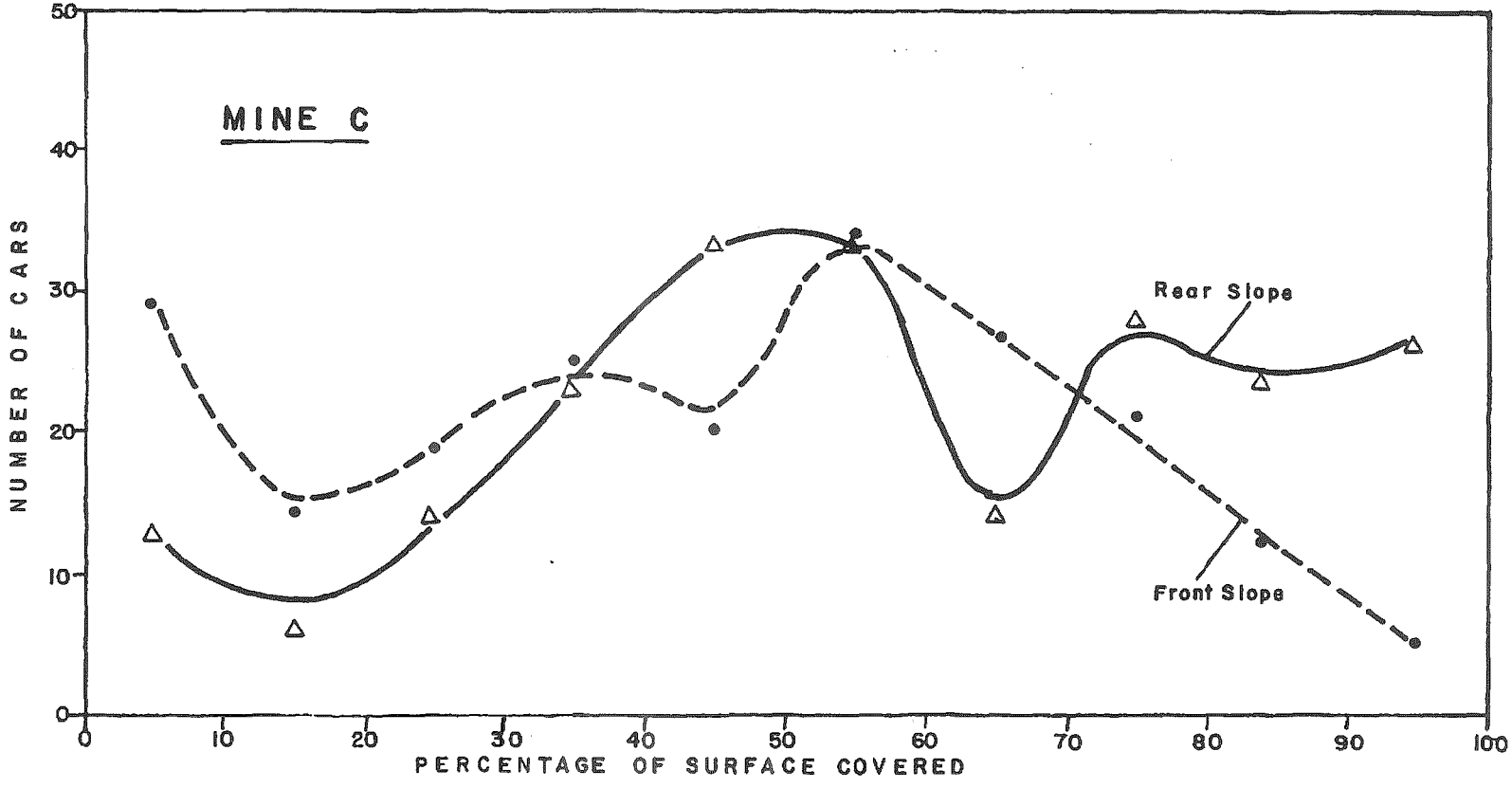


FIGURE 9 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

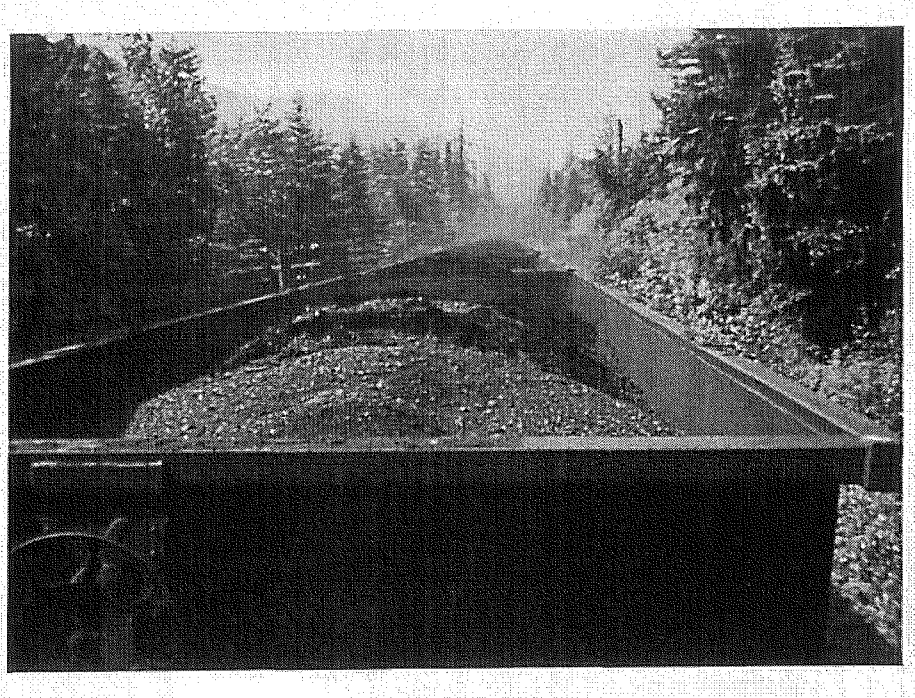


PLATE NO. 1: COAL LOSSES IN TRANSIT

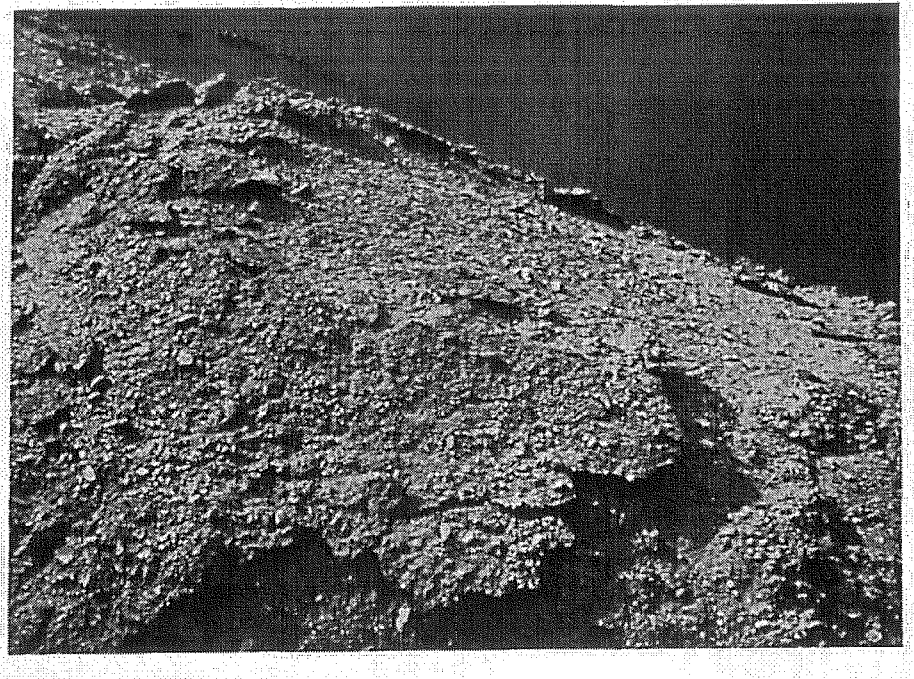


PLATE NO. 2: INCOMPLETE COVERAGE OF SLOPES

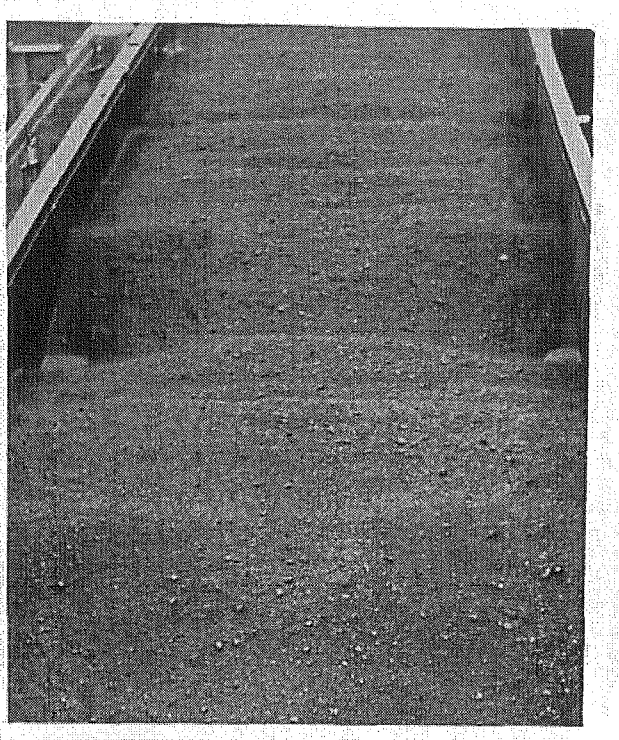
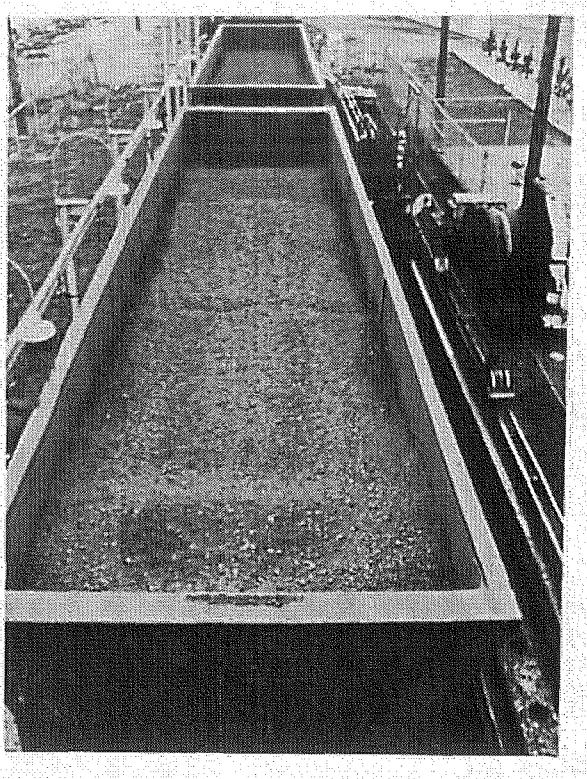


PLATE NO.3: UNTREATED CAR SHOWING POOLS OF WATER AND COARSE COAL

PLATE NO.4: PREFERENTIAL WIND EROSION OF UNTREATED CAR



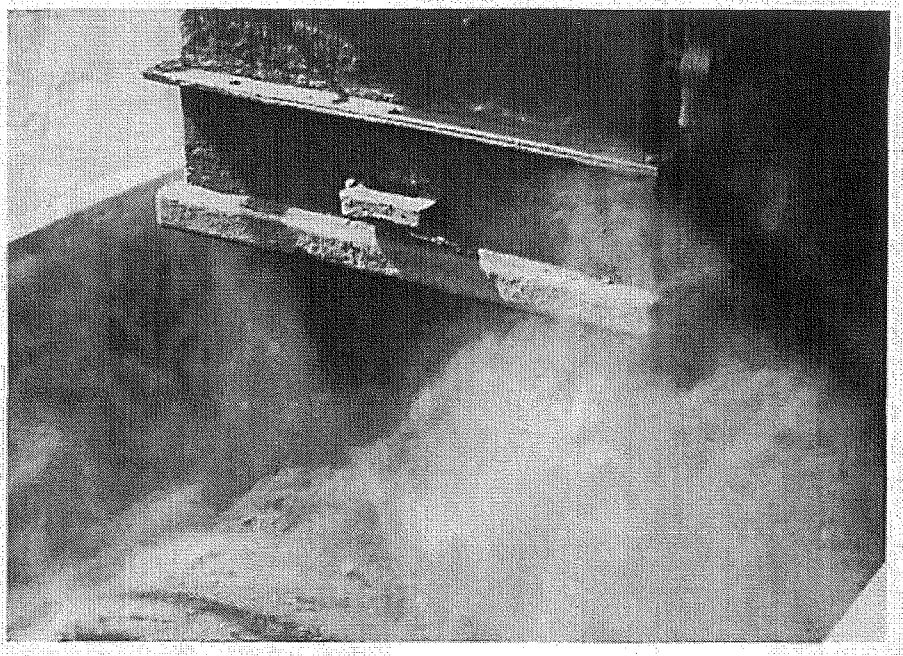


PLATE NO.5: ORIGINAL LOADING METHOD

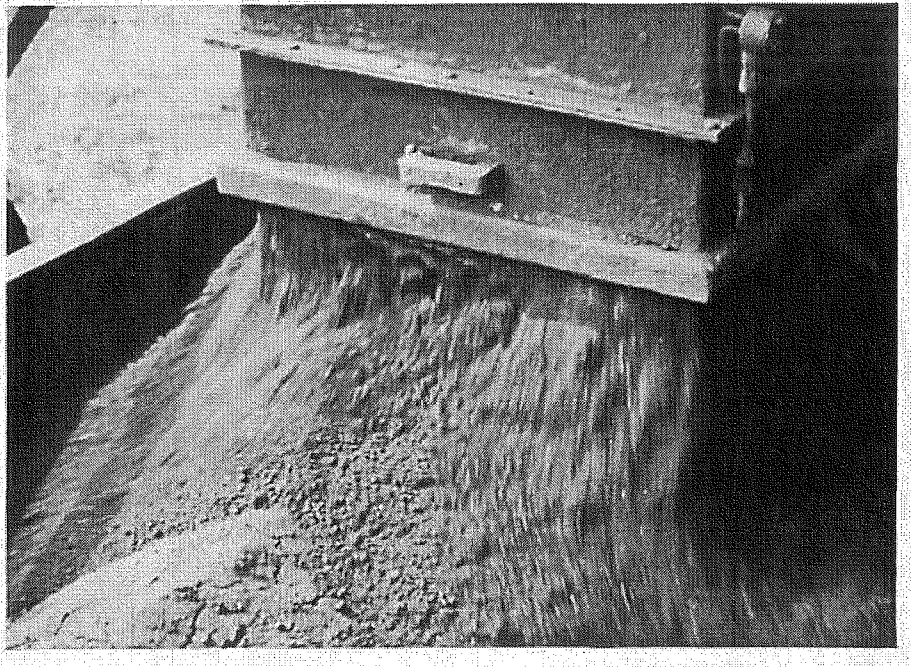


PLATE NO.6: FORMATION OF UNDESIRABLE SLOPES

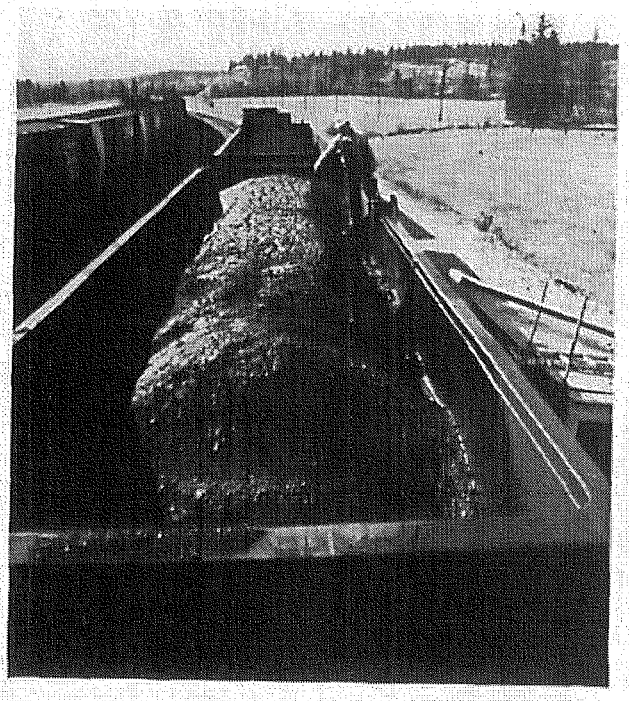


PLATE NO.7: HAND APPLICATION OF ASPHALT EMULSION

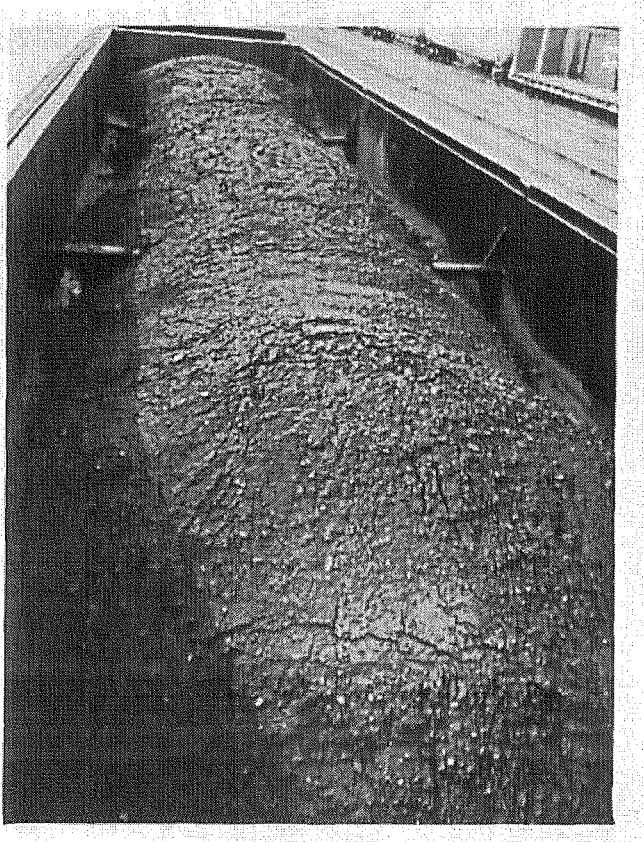


PLATE NO.8: CAR IN PLATE 7 AT KAMLOOPS

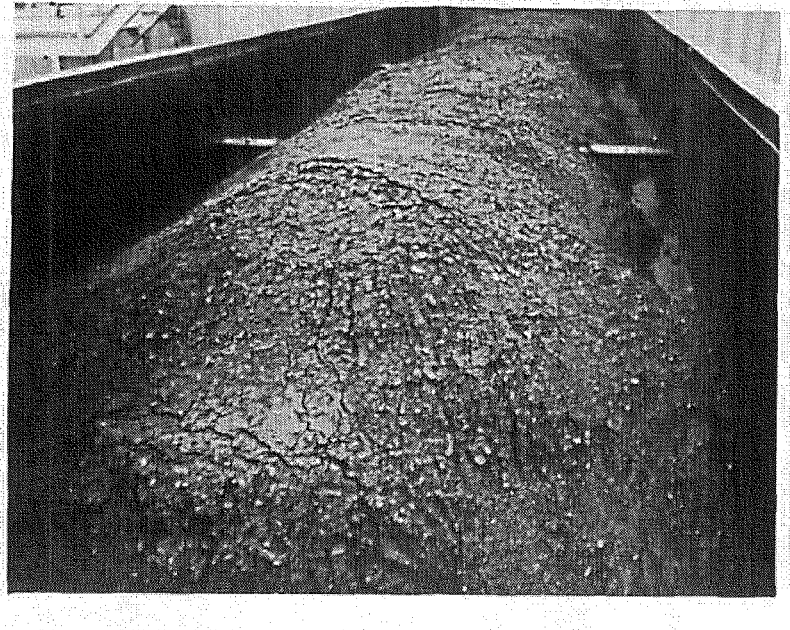


PLATE NO.9: CAR IN PLATE 7 AT WESTSHORE TERMINALS

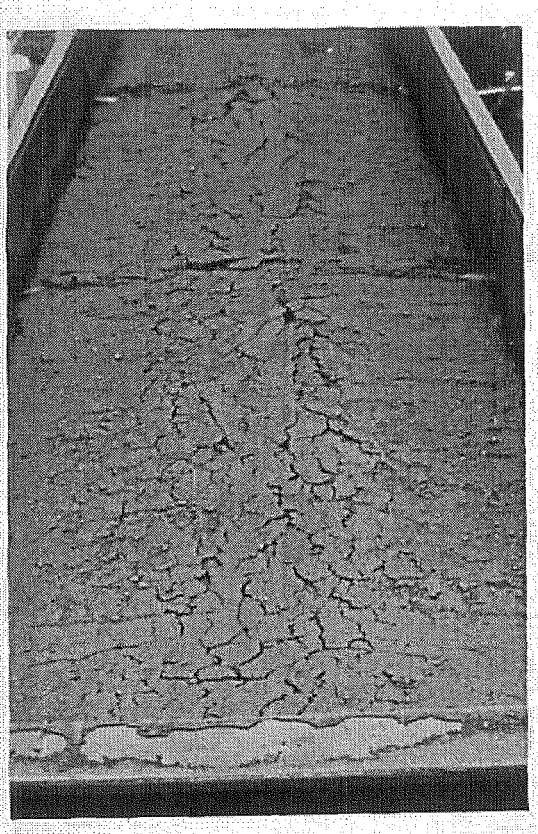


PLATE NO.10: UNIFORM SURFACE COVER

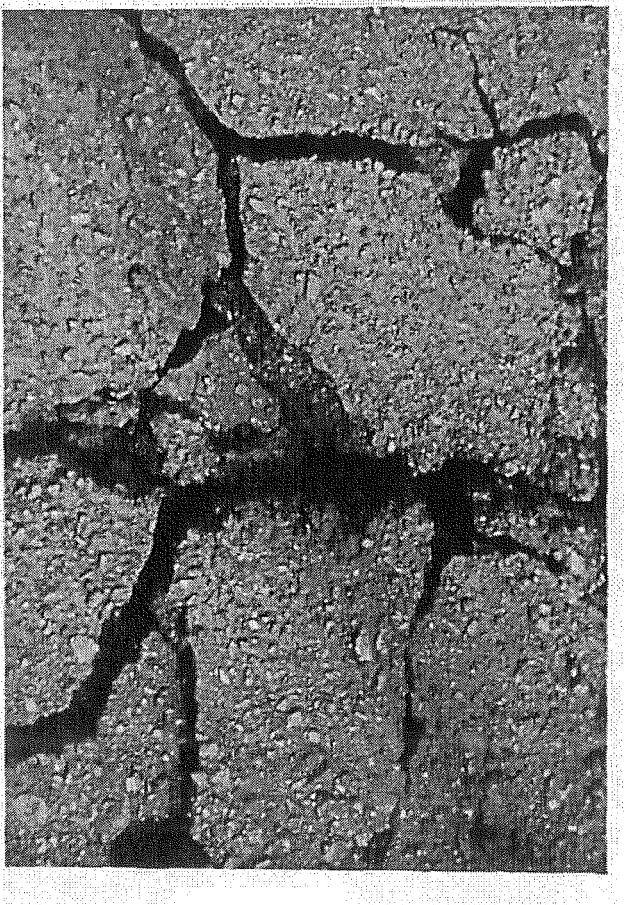


PLATE NO.11: CLOSE-UP SHOWING PENETRATION OF BINDER

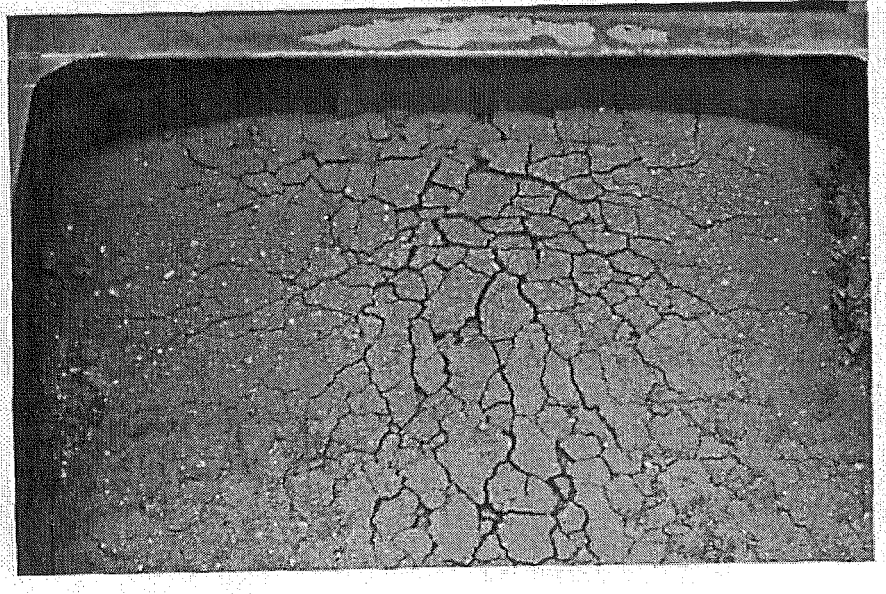


PLATE NO.12: WELL PROTECTED FRONT-END SURFACE

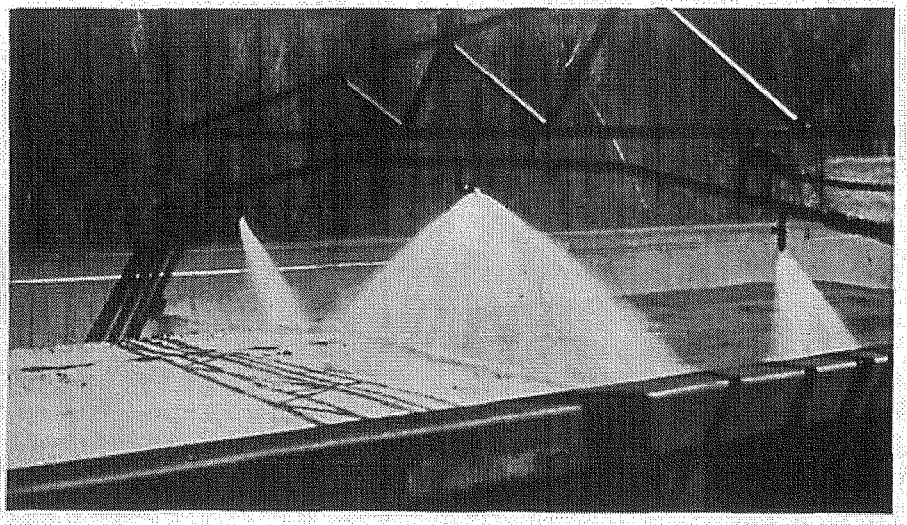
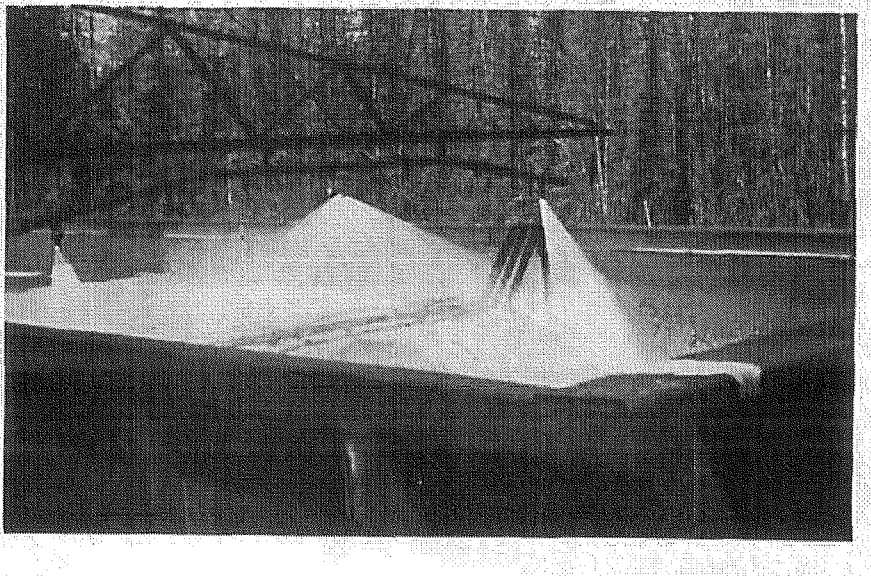


PLATE NO.13: PREFERENTIAL SPRAYING PATTERN OF A WELL PREPARED SURFACE

PLATE NO.14: END SPRAYING



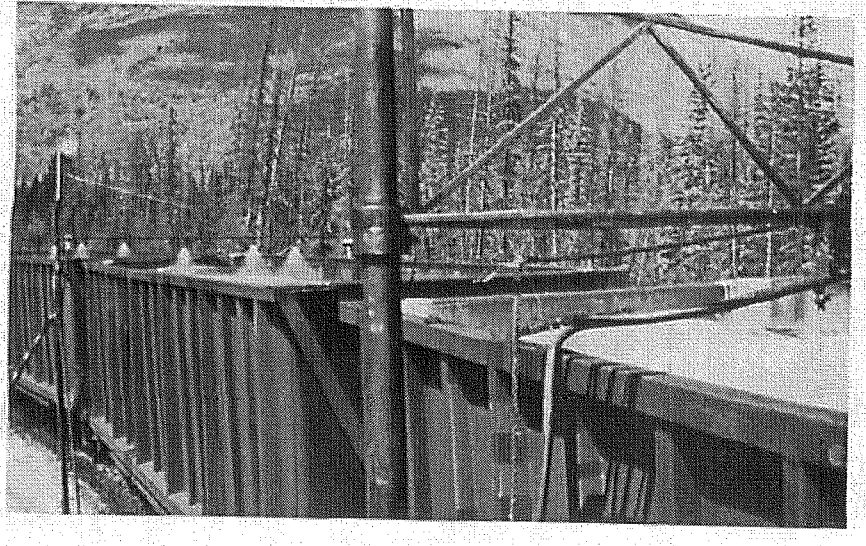


PLATE NO.15: ADDITIONAL WATER SPRAYS TO INCREASE PENETRATION OF BINDER

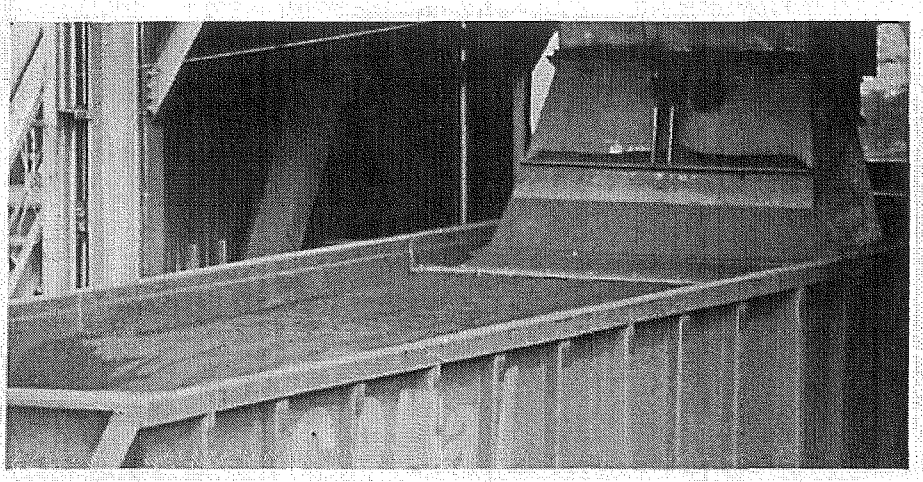


PLATE NO. 16:
MODIFIED LOADING
METHOD

PLATE NO. 17:
COMBINATION OF
FLOODING AND
SPRAYING

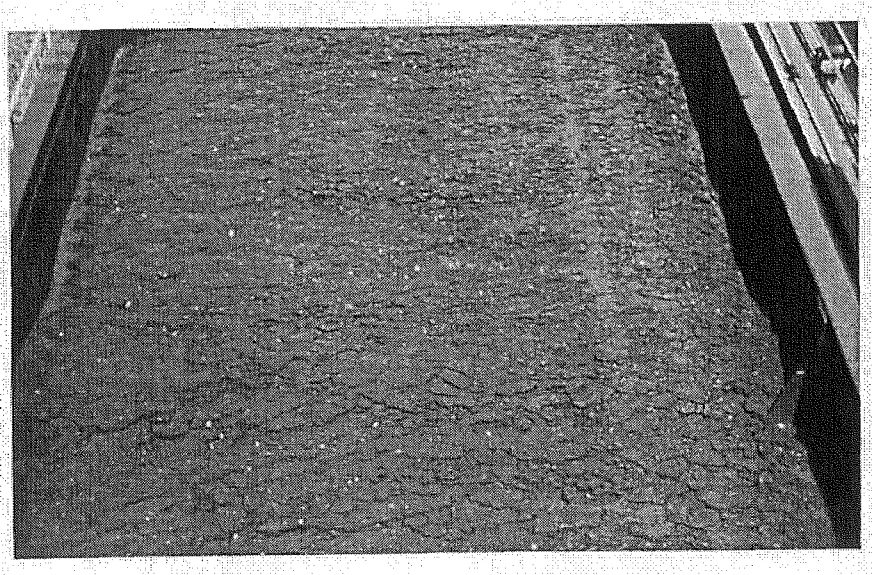


PLATE NO. 18:
PROPERLY LOADED AND
SPRAYED SURFACE

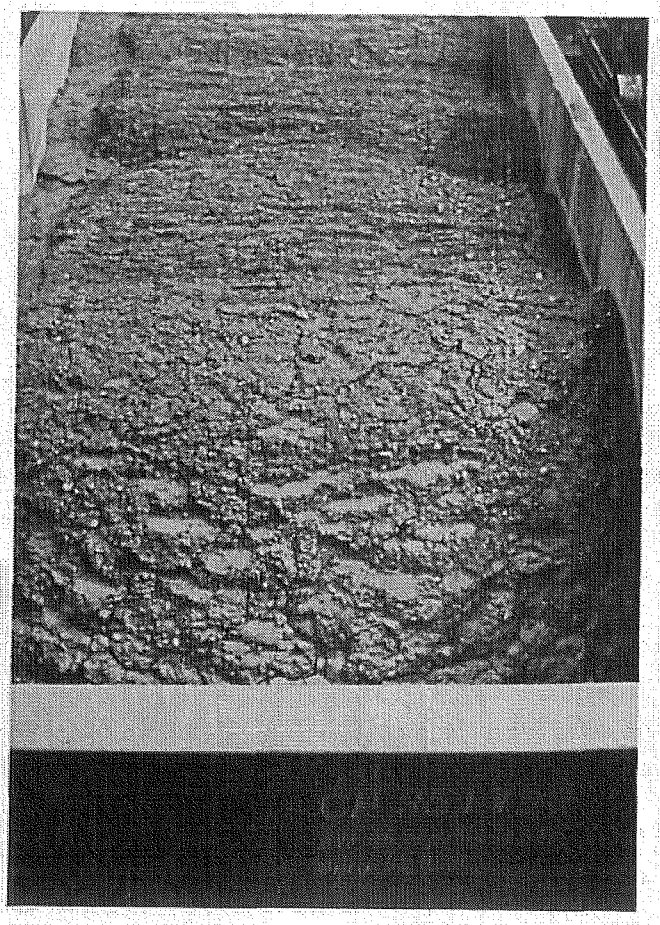


PLATE NO. 19:
EFFECTIVE SPRAYING
ON AN UNEVEN PROFILE

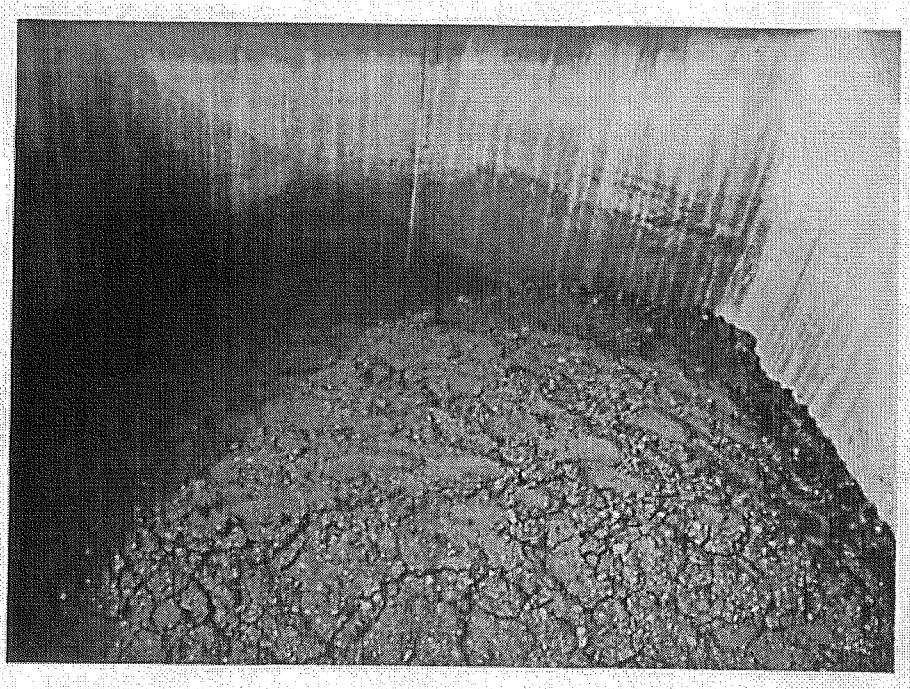


PLATE NO. 20: LIMITED CRUST FAILURE OF SLOPED AREA IN CAR IN PLATE 19

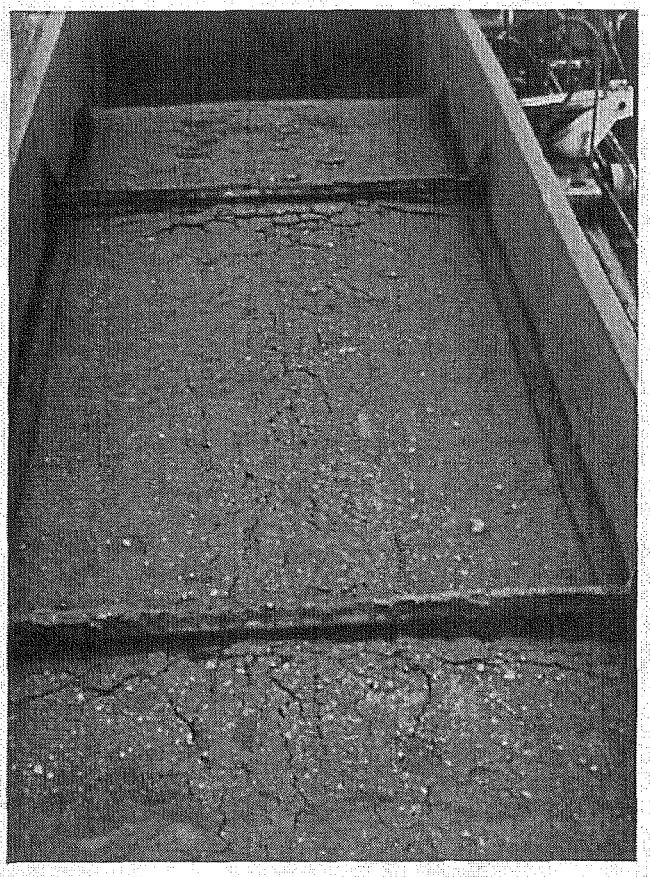
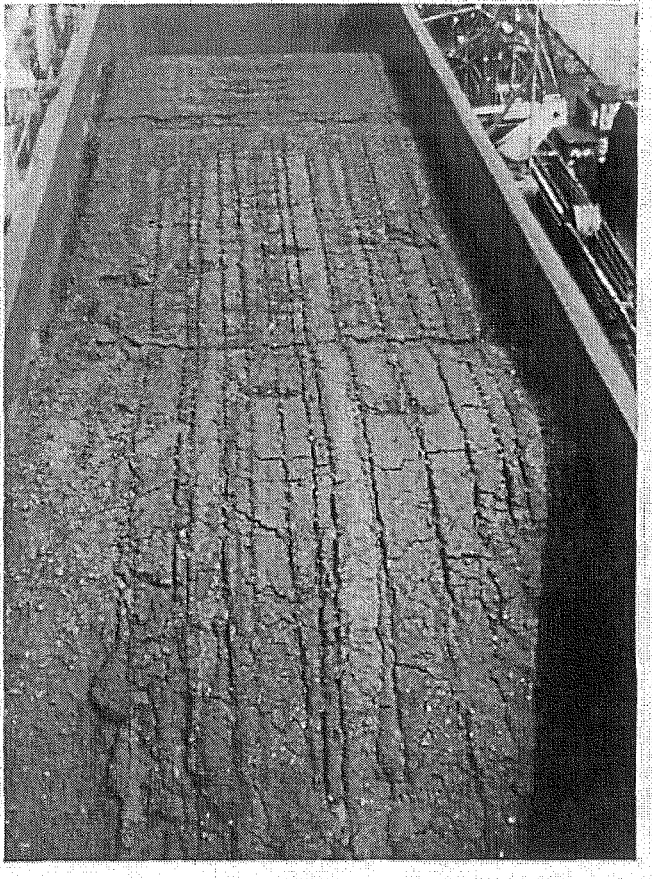


PLATE 21: SLIDE 434-2
MINE B
CAR 349498
DATE SEPT. 3, 1975
COVERAGE 95%

PLATE 22: SLIDE 254-1
MINE C
CAR 351620
DATE Sept. 2, 1975
COVERAGE 70%



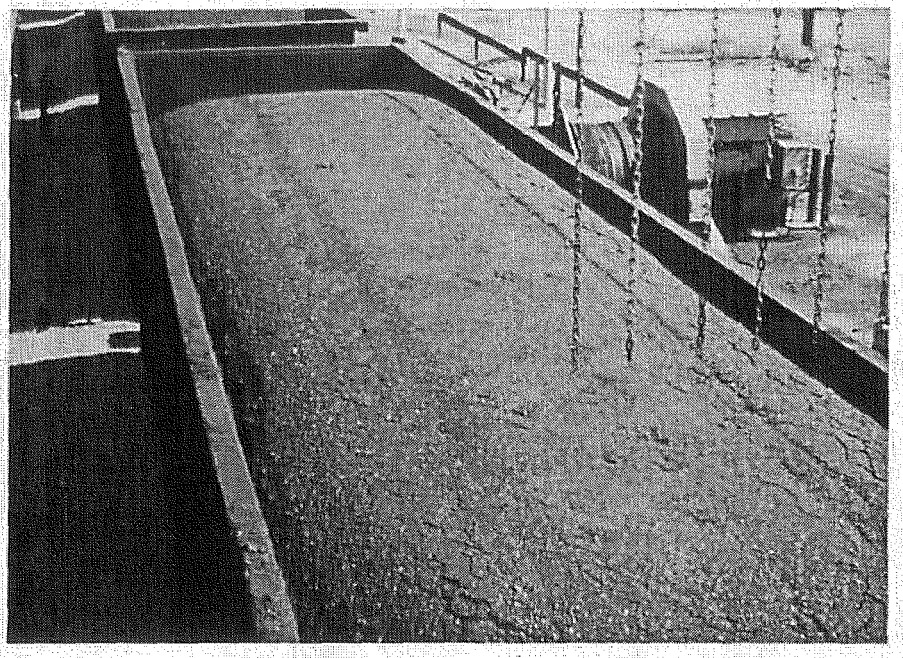
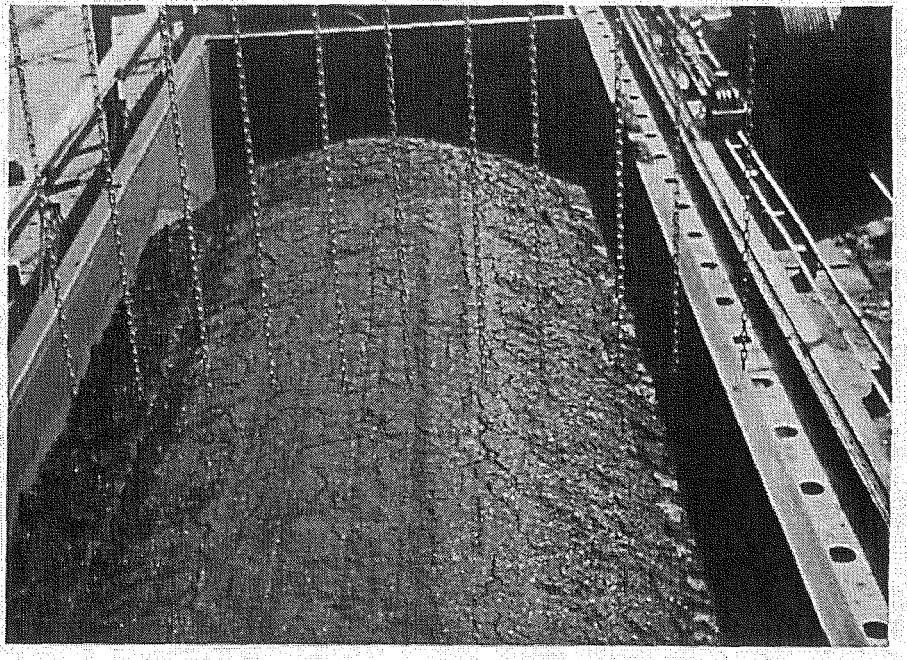


PLATE 23:
SLIDE L154-1
MINE A
CAR 199013
DATE SEPT. 3, 1975
COVERAGE 95%

PLATE 24:
SLIDE M280-10
MINE D
CAR 100945
DATE SEPT. 9,1975
COVEERAGE 80%



CITY OF RIVERSIDE, Plaintiff and Appellant,

v.

CITY OF LOS ANGELES et al., Defendants and Respondents.

No. G043651.

Court of Appeals of California, Fourth District, Division Three.

Filed August 11, 2011.

Chatten-Brown & Carstens, Jan Chatten-Brown, Douglas P. Carstens, Michelle N. Black, Arthur Pugsley; Gregory Priamos, City Attorney, Kristi Smith and Anthony Beaumon, Deputy City Attorneys, for Plaintiff and Appellant.

Carmen A. Trutanich, City Attorney, Thomas A. Russell, Assistant City Attorney, Christopher B. Bobo, Deputy City Attorney; Meyers, Nave, Riback, Silver & Wilson, Amrit S. Kulkarni, Julia L. Bond and Peter S. Hayes for Defendants and Respondents.

NOT TO BE PUBLISHED IN OFFICIAL REPORTS

OPINION

FYBEL, J.

INTRODUCTION

The Port of Los Angeles prepared an environmental impact statement/environmental impact report (EIR) for a project involving the construction and operation of a container terminal in the West Basin of the Port of Los Angeles. The Board of Harbor Commissioners of the City of Los Angeles approved the final EIR. The City of Riverside (the City) sought a writ of mandate from the trial court, challenging the EIR. The trial court denied the petition for a writ of mandate, and the City appeals. (We will refer to respondents the City of Los Angeles, the Los Angeles City Council, the Los Angeles Harbor Department, the Board of Harbor Commissioners, and the Port of Los Angeles collectively as the Port, for ease of reference.)

Having independently reviewed the administrative record, we conclude the Port did not abuse its discretion in certifying the final EIR, and we therefore affirm the trial court's judgment.

STATEMENT OF FACTS

The project involves the construction of a new wharf, additional cranes, the expansion and development of 142 acres of terminal backlands, and the construction of terminal infrastructure at the Port of Los Angeles. In 1997, the Board of Harbor Commissioners certified a program EIR for the West Basin Transportation Improvements Program at the Port of Los Angeles. (*Natural Resources Defense Council, Inc. v. City of Los Angeles* (2002) 103 Cal.App.4th 268, 272.) In March 2001, the City of Los Angeles entered into a lease with China Shipping Holding Co., covering construction of the project as well as later terminal operations. (*Id.* at pp. 277-278.) The city council determined that the 1997 EIR covered the project, and that no additional documentation pursuant to the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) was needed. (*Natural Resources Defense Council, Inc. v. City of Los Angeles*, *supra*, at p. 278.) The Natural Resources Defense Council, Inc., among others, petitioned for a writ of mandate, alleging the City of Los Angeles violated CEQA by entering into the lease without completing an adequate

EIR. (*Id.* at p. 279.) The trial court denied the petition. (*Ibid.*) On appeal, the court concluded the Port of Los Angeles had failed to prepare a proper EIR, and the environmental review had been improperly segmented. (*Id.* at pp. 284-285.) The Port was ordered to prepare a proper EIR. (*Id.* at pp. 285-286.)

Phase I of the project has been completed. The present matter involves the EIR for phases II and III of the project. The Port released a draft EIR for public comment in August 2006. Numerous comments were received. Based on the comments received, the Port thoroughly revised and expanded the draft EIR for a second round of public review and comment in April 2008 (the recirculated draft EIR).

The City and the Riverside County Transportation Commission (RCTC) submitted comments on the recirculated draft EIR, asserting it had not adequately analyzed impacts to rail and road traffic in the City and Riverside County. The RCTC identified 12 at-grade rail crossings it claimed would be seriously affected by the project. The Port investigated existing conditions at those rail crossings.

In the final EIR, the Port responded to the comments to the recirculated draft EIR, including those by the City and the RCTC. The final EIR found that project-related rail activity would not result in significant traffic delays at rail crossings in the City or in Riverside County.

The Board of Harbor Commissioners held a hearing on the recirculated draft EIR on December 18, 2008. At the end of the hearing, the board unanimously certified the final EIR and approved the project. In its findings, the board concluded that, apart from two rail crossings near the Port of Los Angeles itself, the project would not cause significant rail crossing delay impacts, or contribute to significant cumulative rail crossing impacts. Specifically responding to comments from the City and the RCTC, the final EIR concluded: "The comments from the City of Riverside and RCTC both suggest that the findings in the Recirculated Draft EIS/EIR are not correct and that the proposed Project would cause significant impacts within Riverside from truck and rail traffic in addition to the two local intersections identified in the Recirculated Draft EIS/EIR. Characterizing congestion in Riverside County as caused by the Ports is incorrect and unsubstantiated. Rather, congestion in Riverside County is predominantly a result of land use planning and growth policies and decisions of the jurisdictions within the county."

PROCEDURAL HISTORY

The City filed a petition for a writ of mandate, and complaint for declaratory and injunctive relief, on February 18, 2009. (The case was originally filed in Los Angeles Superior Court, but was transferred to Orange County Superior Court pursuant to a stipulated order.)

The trial court issued a minute order denying the petition for a writ of mandate. The court entered judgment in favor of the Port on April 8, 2010. The City timely appealed.

DISCUSSION

I.

STANDARD OF REVIEW

The parties initially disagree on the standard of review this court must apply. The appropriate standard of review was set forth by the California Supreme Court in *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 426-427: "In reviewing an agency's compliance with CEQA in the course of its legislative or quasi-legislative actions, the courts' inquiry `shall extend only to whether there was a prejudicial abuse of discretion.' [Citation.] Such an abuse is established `if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence.' [Citations.] [¶] An appellate court's review of

the administrative record for legal error and substantial evidence in a CEQA case, as in other mandamus cases, is the same as the trial court's: The appellate court reviews the agency's action, not the trial court's decision; in that sense appellate judicial review under CEQA is de novo. [Citations.]" (Fns. omitted.) In other words, on appeal, we independently review the administrative record to determine whether the Port prejudicially abused its discretion.

"`"`Substantial evidence is defined as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached."'" [Citation.] `"In determining whether substantial evidence supports a finding, the court may not reconsider or reevaluate the evidence presented to the administrative agency. [Citation.] All conflicts in the evidence and any reasonable doubts must be resolved in favor of the agency's findings and decision. [Citation.] [¶] In applying that standard, rather than the less deferential independent judgment test, `the reviewing court must resolve reasonable doubts in favor of the administrative findings and decision.'" [Citations.]" (*Citizens for Responsible Equitable Environmental Development v. City of San Diego* (2011) 196 Cal.App.4th 515, 522-523.)

Our role as a reviewing court is to consider the sufficiency of the EIR as an informational document. (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392.) "A court may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable. [Citation.] A court's task is not to weigh conflicting evidence and determine who has the better argument when the dispute is whether adverse effects have been mitigated or could be better mitigated. We have neither the resources nor scientific expertise to engage in such analysis, even if the statutorily prescribed standard of review permitted us to do so. Our limited function is consistent with the principle that `The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. CEQA does not, indeed cannot, guarantee that these decisions will always be those which favor environmental considerations.' [Citation.]" (*Id.* at p. 393.)

II.

EXHAUSTION OF REMEDIES

The Port argues that many of the arguments raised by the City on appeal were neither raised in the administrative proceeding, nor preserved in the trial court.

Public Resources Code section 21177, subdivision (a) provides: "An action or proceeding shall not be brought pursuant to Section 21167 unless the alleged grounds for noncompliance with this division were presented to the public agency orally or in writing by any person during the public comment period provided by this division or prior to the close of the public hearing on the project before the issuance of the notice of determination."

The purpose of the exhaustion of administrative remedies doctrine is to give the public agency the opportunity to receive and respond to specific factual and legal issues. (*Coalition for Student Action v. City of Fullerton* (1984) 153 Cal.App.3d 1194, 1197-1198. "[T]he exact issue raised in the lawsuit must have been presented to the administrative agency so that it will have had an opportunity to act and render the litigation unnecessary." (*Resource Defense Fund v. Local Agency Formation Com.* (1987) 191 Cal.App.3d 886, 894; see *Citizens for Responsible Equitable Environmental Development v. City of San Diego, supra,* 196 Cal.App.4th at p. 527 ["general, unelaborated objections [are] insufficient to satisfy the exhaustion doctrine"]; *Sierra Club v. City of Orange* (2008) 163 Cal.App.4th 523, 535 ["`"exact issue"' must have been presented to administrative agency in order to exhaust administrative remedies in CEQA case]; *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777, 791 [arguments against plan on same general topic do not save specific statutory argument that was not raised at administrative proceeding level].) If the exhaustion of administrative remedies doctrine applies, a court does not have the discretion to refuse to apply it. (*Azusa Land Reclamation Co. v. Main San Gabriel Basin Watermaster* (1997) 52 Cal.App.4th 1165, 1215-1216.)

The **City** bears the burden of demonstrating that the issues raised in its appellate briefs were first raised at the administrative proceeding level. (*Sierra Club v. **City** of Orange, supra,* 163 Cal.App.4th at p. 536.)

An exception to the exhaustion of administrative remedies doctrine applies when the agency fails to provide sufficient opportunity to the public to raise objections to the project. Public Resources Code section 21177, subdivision (e) provides: "This section does not apply to any alleged grounds for noncompliance with this division for which there was no public hearing or other opportunity for members of the public to raise those objections orally or in writing prior to the approval of the project, or if the public agency failed to give the notice required by law." As will be explained *post,* the **City** cannot establish any lack of notice by the Port, and the **City** does not claim any lack of a public hearing or lack of an opportunity to provide written comments.

Additionally, the **City** cannot argue on appeal issues that were not raised in the trial court. (*A Local & Regional Monitor v. **City** of **Los Angeles*** (1993) 12 Cal.App.4th 1773, 1804.) This rule, too, is subject to exceptions. An appellate court may consider issues that are pure questions of law, such as whether the EIR was adequate as a matter of law, or whether the issue is one of public interest. (*Woodward Park Homeowners Assn., Inc. v. **City** of Fresno* (2007) 150 Cal.App.4th 683, 713-714.)

III.

THE PORT'S RESPONSE TO COMMENTS BY THE CITY AND THE RCTC WAS TIMELY.

The **City** argues the Port failed to comply with the requirements of Public Resources Code section 21092.5, subdivision (a), which provides, in part: "At least 10 days prior to certifying an environmental impact report, the lead agency shall provide a written proposed response to a public agency on comments made by that agency." (See also Cal. Code Regs., tit. 14, § 15088, subd. (b).) The **City** claims it received the Port's responses to its comments on December 9, 2008, while the EIR was certified fewer than 10 days later, on December 18.

But the administrative record contains a cover letter dated December 5, 2008, under which the response to comments document was sent to all commenting agencies. Additionally, at the final hearing, the director of environmental management of the Port of **Los Angeles** testified that the Port both mailed and e-mailed the response to comments to the **Riverside City** Attorney's Office on December 5. The **City** concedes, in its reply brief on appeal, that the Port's response was mailed 13 days before the hearing. The **City** argues, without any authority, that the Port failed to meet its obligation because the **City** did not receive the response until four days later.

We conclude the Port met its obligation to provide a written response to comments at least 10 days prior to certifying the EIR by mailing and e-mailing the response 13 calendar days before the hearing. The **City** has failed to establish a lack of compliance with the applicable notice requirements.

IV.

THE RECIRCULATED DRAFT EIR DID NOT DEFINE THE AREA AFFECTED BY THE PROJECT TOO NARROWLY.

The recirculated draft EIR identified two at-grade rail crossings near the Port of **Los Angeles**, which would experience significant, unavoidable impacts from the project. The recirculated draft EIR determined there would be no other negative impacts from the project due to rail-related issues: "[R]ail-related impacts due to the proposed Project are limited to the at-grade crossings that are located south of the downtown rail yards, and are focused on the at-grade crossings on local lines in and near the Port."

The recirculated draft EIR concluded the project would not cause significant rail-related impacts outside the general Port of **Los Angeles** area. "The Project will not cause significant rail-related impacts on lines that lead north or east of the downtown rail yards. Rail trips are not controlled by the Port. Currently, the unit trains built at the on-dock and near dock facilities can be picked up by [Burlington Northern Santa Fe Railway] and/or [Union Pacific]. Both rail companies use the Alameda Corridor to travel to the downtown rail yards. To the east of the downtown rail yards, some of the trains are broken down, reconfigured and otherwise modified at the location of the downtown rail yards from that point to the east. Other trains remain unit trains through the downtown rail yard; there are approximately nine major routes with a number of subroutes that the trains can take to leave the state. The rail operators, and not the Port, make the choice of what routes the trains will take, the day they will move and the time of day the trains will move. Furthermore, the rail mainline tracks were designed and built to accommodate the anticipated rail activity in the region. Rail volumes on the mainline are controlled and limited by the capacity of the mainline itself, thus by definition the project's trains could not traverse the mainline unless it still has remaining capacity. The number of trains generated by the project would not cause the mainline rail tracks to exceed the regional capacity. Once the regional mainline rail track capacity would be exceeded due to increases in regional rail activity, separate environmental studies on the mainline expansion would be undertaken by the rail companies, not by each shipper or carrier generating rail volumes."

The **City** and the RCTC made numerous comments regarding the recirculated draft EIR, all of which were tied to the effect of increased rail traffic. The Port responded to those comments in the final EIR. The **City**, however, argues that the Port erred in its response to those comments. The **City's** arguments in this regard are lengthy and detailed.

Although the **City** does not make this specific argument in its appellate briefs, a theme running through the entirety of its arguments is that the Port erred by failing to consider the rail-related impacts on the **City** and **Riverside** County in the recirculated draft EIR. (This argument was raised specifically in the trial court.) An EIR must include the proper boundaries for a project when determining the environmental impact it might have. "An EIR is required to discuss significant impacts that the proposed project will cause in the area that is affected by the project. [Citation.] This area cannot be so narrowly defined that it necessarily eliminates a portion of the affected environmental setting." (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1216.)

The area considered by the recirculated draft EIR was not too narrowly defined. The recirculated draft EIR considered rail-related impacts in the areas immediately adjacent to the project site, and as far away as the **Los Angeles** rail yards, 20 miles from the project site. This case is distinguishable from the cases cited by the **City**. In *Bakersfield Citizens for Local Control v. City of Bakersfield, supra,* 124 Cal.App.4th at page 1216, the appellate court concluded the EIR's for two retail shopping centers, which were located 3.6 miles apart and shared four arterial roadways, were insufficient for failing to consider the other center when examining the cumulative impacts of each. In *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 724, the appellate court concluded an EIR that described the project site as surrounded by farmland was deficient for failing to consider that the project site was adjacent to the San Joaquin River, a wildlife preserve was nearby, and wetlands might be located on the project site.

"An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (Cal. Code Regs., tit. 14, § 15125, subd. (a).) The California Code of Regulations does not define "vicinity" and no published case appears to have considered the issue. "Vicinity" has been defined as "1: the quality or state of being near: nearness, propinquity, proximity . . . 3: a surrounding area or district: locality, neighborhood . . . ." (Webster's 3d New Internat. Dict. (2002) p. 2550, capitalization omitted.) Another definition for "vicinity" is: "A place near to a place designated, but not adjoining or abutting on it." (Ballentine's Law Dict. (3d ed. 1969) p. 1342.)

The recirculated draft EIR and final EIR included several depictions of the "Project Site and Vicinity," which were limited in scope to the Port of **Los Angeles** and the area immediately around it. No commenter appears to have questioned or criticized the EIR's use of the term "vicinity."

We conclude neither the City nor the County of Riverside is in the "vicinity" of the project. The Port did not abuse its discretion by failing to include in the recirculated draft EIR an analysis of rail-related impacts on the City and County of Riverside. Nevertheless, as explained in section VI *post*, in the final EIR, the Port did consider the potential impact of the project in the City and County of Riverside in its response to the comments of the City and the RCTC.

V.

THE CITY FAILED TO EXHAUST ITS REMEDIES REGARDING CHALLENGES TO THE METHODOLOGY USED BY THE PORT IN THE RECIRCULATED DRAFT EIR TO ANALYZE RAIL-RELATED IMPACTS.

The recirculated draft EIR identified the level of significance for traffic delays at railroad crossings as follows: "An increase in rail activity could cause delays to motorists at the affected at-grade crossings where additional project trains would cross and/or where the project would result in additional vehicular traffic flow. The project is considered to have a significant impact at the affected at-grade crossings if the average vehicle control delay caused by the project at the crossing would exceed the Highway Capacity Manual (HCM) threshold for level of service E at a signalized intersection, which is 55 seconds of average vehicle delay."

In its respondent's brief on appeal, the Port explains its methodology of analyzing rail crossing delays as follows: "The AVD [(average vehicle delay)] methodology, and 55-second AVD threshold of significance, work as follows: First, the Port collects data on gate blockage time per passing train (in minutes); average `arrival rate' of vehicles at a crossing (in minutes per road lane); frequency of passing trains at a crossing (per hour); and number of road lanes at a crossing. . . . Using those data, and a formula set out in the EIR, the Port calculates the `total traffic delay' — i.e., the aggregate amount of delay, experienced by the *entire body of vehicles as a whole*, at a given crossing in a given hour, due to the passage of trains. . . . Then, the Port averages `total traffic delay' over the number of vehicles using that crossing in a given hour (whether delayed by a train or not), to identify `average vehicle delay,' i.e., *how much delay is experienced, on average, by each individual vehicle* which uses the crossing in that hour. . . . Finally, the Port compares `average vehicle delay,' expressed in seconds, to a standard, drawn from the HCM, under which a crossing is determined to operate at an unacceptable LOS [(level of service)] if average vehicle delay, among all vehicles using a given crossing in the peak traffic hour, is equal to or greater than 55 seconds. . . . [¶] The Port's methodology therefore (1) yields information on how much delay an individual vehicle will experience, on average, at a given rail crossing in a given hour and (2) allows for comparison to a recognized standard for determining the significance of a project's impacts on the operational LOS of a roadway intersection."

The RCTC attached to its comment letter a technical review of the recirculated draft EIR's analysis of potential environmental impacts in Riverside County. The technical review analyzed the impact of rail-related traffic delays, as well as increased emission of pollutants and traffic delays caused by an increased number of trucks transporting goods from the Port of Los Angeles. The technical review noted that the recirculated draft EIR did not identify any potential impacts in Riverside County, but made its own finding that an anticipated impact of the project would be "additional freight rail traffic carrying containers through Riverside County (particularly the impacts caused by the trains passing through at-grade rail crossings, where traffic is delayed waiting for the trains)." It concluded that the effect of the additional cargo containers carried through Riverside County by train due to the increased traffic from the project would result in an increased delay of 36.3 vehicle hours per day. The technical review also identified 12 crossings in Riverside County "where the additional container traffic would increase the existing delay by at least one vehicle-hour of delay per day."

The City raises numerous challenges to the average vehicle delay methodology in the EIR. These challenges, however, are barred by the City's failure to exhaust the issue. The City admits this issue was not raised in its comments on the recirculated draft EIR, but argues it did not realize the Port's methodology was an issue until the trial

court hearing on the petition for a writ of mandate. Having thoroughly reviewed the administrative record and the appellate record, we conclude the Port fully and accurately explained its methodology in the recirculated draft EIR. The confusion resulting from a mistaken description of the EIR's methodology in the Port's trial brief does not mean the recirculated draft EIR misrepresented the methodology, so as to relieve the City of its failure to exhaust the issue in the administrative proceedings.

VI.

DID THE PORT PROVIDE ADEQUATE RESPONSES TO THE COMMENTS RAISED BY THE CITY AND THE RCTC?

The City argues that the Port failed to respond to many of the comments raised by the City and the RCTC regarding rail-related environmental impacts from the project, and failed to provide analysis specifically requested by the City. The failure to respond to public comments on a draft EIR can constitute an abuse of discretion by the lead agency. "The Port [of Oakland]'s response fell far short of the `good faith reasoned analysis' mandated by CEQA for responding to significant conflicting information generated by the public. [Citations.] Much information of vital interest to the decision makers and to the public pertaining to toxic air contamination was simply omitted. In other instances, the information provided was either incomplete or misleading. The dispute in this regard goes beyond a disagreement of qualified experts over the reasoned conclusions as to what the data reveals. The EIR failed to acknowledge the opinions of responsible agencies and experts who cast substantial doubt on the adequacy of the EIR's analysis of this subject. The conclusory and evasive nature of the response to comments is pervasive, with the EIR failing to support its many conclusory statements by scientific or objective data. These violations of CEQA constitute an abuse of discretion." (*Berkeley Keep Jets Over the Bay Com. v. Board of Port Cmrs.* (2001) 91 Cal.App.4th 1344, 1371.)

The Port notes that in responding to the comments of the City and the RCTC, the Port conducted a field investigation and analysis of existing conditions at the rail crossings identified by the RCTC. Based on this analysis, the Port concluded there would not be any significant impact to rail crossings in the City and County of Riverside as a result of the project.

In determining whether the Port responded adequately to the comments, we consider whether substantial evidence in the record supports the response. An agency must provide a good faith, reasoned response to public comments on a draft EIR. "The written response shall describe the disposition of significant environmental issues raised . . . . In particular, the major environmental issues raised when the lead agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail giving reasons why specific comments and suggestions were not accepted. There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice." (Cal. Code Regs., tit. 14, § 15088, subd. (c).) The response need not be exhaustive as long as it adequately addresses the issues raised in the comments. (*Towards Responsibility in Planning v. City Council* (1988) 200 Cal.App.3d 671, 683.) A lead agency is "not required to exhaust all suggested testing before EIR certification [citation], particularly since there was expert opinion indicating that further investigation was not necessary. `Just as an agency has the discretion for good reason to approve a project which will admittedly have an adverse environmental impact, it has discretion to reject a proposal for additional testing or experimentation.' [Citation.]" (*Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal.App.4th 74, 102.)

A.

The final EIR did not fail to disclose the basis of train projections, as requested by the City's comments.

The recirculated draft EIR projected 817 annual rail round trips attributable to the project by 2030. The **City's** comment letter complained that the basis for this estimate was not included: "The data and calculations underlying the 817 estimated rail round-trips were not included in the [recirculated draft] EIR or its appendices. There is a passing citation to the `Rail Master Plan and actual Yang Ming rail yard projections' on [the recirculated draft] EIR page 2-2, but those projections are never revealed. There is no way to verify the timeliness, accuracy, applicability, or even the existence of the data. Those data must be included and analyzed in the [recirculated draft] EIR discussions and analysis, or at the very least, as an appendix." The Port's response to this comment reads: "The count of 817 rail round trips required for the projected Project is based on the projected terminal TEU[1] throughput and the percentage of total throughput that would be transported via rail. Please see Table E12.-13 in Appendix E of the Recirculated Draft EIS/EIR."[2]

It is probably self-evident that correct assumptions regarding the estimated increase in rail traffic generated by the project are necessary. Without a reasonable, good faith analysis, the EIR is not proper. And without a realistic estimate of what impact the project might have on the environment, a reasonable, good faith analysis is not possible. Did the Port, in its response to the **City's** comments or in the EIR itself, provide the evidence from which we can conclude the estimates of increased rail traffic are realistic?

The **City** contends that the Port's "failure to disclose the assumptions upon which the projections were based is a fatal flaw in the EIR." Having reviewed the recirculated draft EIR, it appears the Port provided an estimate of the TEU's generated annually by the project (figures that the **City** does not challenge), as well as an estimate of the TEU's that would be distributed to rail yards. Those estimates form the basis for the estimate of the increased number of train trips. Reference to the EIR itself may constitute a satisfactory response to a comment. (*Eureka Citizens for Responsible Government v. **City** of Eureka* (2007) 147 **Cal**.App.4th 357, 378.)

The **City** argues the estimate of the percentage of TEU's that would be transported by rail in the EIR is contradicted by two other studies included in the EIR—the EIR prepared for the West Basin Transportation Improvements Program and the Ports of Long Beach/**Los Angeles** Transportation Study. The final EIR for the West Basin Transportation Improvements Program estimates, "[a]pproximately 50 percent of all containers passing through the West Basin terminals are expected to be transported by rail. This assumption is consistent with the *Alameda Corridor Environmental Impact Statement* (Federal Highway Administration, Federal Railroad Administration, and California Department of Transportation 1996) and the Deep Draft Navigation Improvements Project (COE, LAHD 1992)." Although the 50 percent estimate in the West Basin Transportation Improvement Program EIR is more than the 36.5 percent figure used in the EIR for this project, the West Basin program was vastly different in size, and that EIR was prepared 10 years before the EIR in this case. An earlier, different EIR's use of different estimates of rail transportation of containered material does not make the EIR for this project inaccurate or incomplete.

Similarly, the Ports of Long Beach/**Los Angeles** Transportation Study estimates that by 2010, "50 percent of all containers that move through the Ports will be transported by rail to inland destinations via on-dock and off-dock railyards." The purposes of this study, performed in 2001, were to identify potential problems in the transportation system throughout the Port of **Los Angeles** and Port of Long Beach, and develop an implementation plan for addressing any deficiencies in the system. The study was not intended as an environmental review document, and dealt with a much larger area than does the EIR for this project. Its applicability to the present issue is limited, at best.

Moreover, as the Port notes, the Port's additional analysis regarding traffic delays due to increased rail traffic that was performed in the **City** and County of **Riverside** in response to the comments raised by the **City** and the RCTC did not use the rail estimates included in the recirculated draft EIR; the analysis used the RCTC's technical review's estimate that four additional trains per day attributable to the project would pass through **Riverside** and its environs. In its response to the comments, the Port accepted the technical review's assumptions. The Port's reliance on one set of assumptions rather than that contained in other documents does not invalidate the EIR, as long as the assumptions and conclusions on which the Port relied are supported by substantial evidence. (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at pp. 392-393.)

The City also argues that the EIR's estimate of rail trips does not account for the EIR's inclusion of an incentive program to promote rail use. Its citation to the administrative record for this factual statement is actually a reference to the initial draft EIR; the City does not cite to any spot in the recirculated draft EIR or the final EIR that includes a reference to an incentive program for the Port of Los Angeles tenants to use rail rather than trucks. We do not find the argument compelling.

Finally, the City argues that the EIR is not clear about whether rail trips from other nonproject areas of the Port of Los Angeles are included in the estimate of rail trips generated by the project. (The Port does not specifically address this argument.) We discern no such lack of clarity. The recirculated draft EIR provides estimates of the increase in container traffic, and the attendant increase in rail-related traffic related to the project.

B.

The final EIR did not fail to address impacts to emergency services.

The City argues the Port failed to adequately respond to its comment that increased rail traffic due to the project would adversely impact the provision of emergency services in the City and County of Riverside. The comment letter stated: "Police, fire and EMT officials reported 491 delays at Riverside's at-grade crossings between 2002 and 2007. Responder delays averaged 3 minutes and were as long as 21 minutes. [¶] In the first half of 2007, Riverside experienced 82 rail-delayed fire trucks and ambulances, for a total of 256 minutes. Each of those minutes can represent life or death. Heart attack survival rates can drop from 7% to 10% for each minute of delay. Brain damage can occur in 3 to 4 minutes. From December 1, 2006 to April 24, 2007, rail delays affected 270 police vehicles, for a total of 1,327 minutes (22.12 hours). Again, those minutes can mean life or death."

The reference to emergency vehicle delays is one of several examples in the City's comment letter of how the project and the increased number of trains attributable to the project will adversely impact the City and County of Riverside. (After stating that "[r]epeated rail-scheduling conflicts result in serious delays in Riverside, and elsewhere," the comment letter reads, "For example," and then lists several bullet points that describe specific problems caused by rail-related delays.) Although the City does not specifically make this point, considering its comment letter in toto, the City was arguing the increase in rail traffic from the project would exacerbate problems with emergency service delays. We therefore reject the Port's argument that this issue was not fully raised or developed by the City.

The problem is that there is no evidence supporting any one of the factual claims made in the City's comment letter. The City apparently provided the Port with a copy of an August 2006 report by the Federal Railroad Administration on the impact of blocked highway and rail grade crossings on emergency response services. That report includes the unassailable finding that "[b]locked crossings . . . can be a particularly serious problem for emergency responders." The report does not include any data or analysis specific to the City or County of Riverside (although, interestingly, it uses the improvements to the Alameda corridor, which are discussed in the EIR, as a case study for dealing with problems of grade crossing delays to emergency responders).

The Port's response to this comment cross-referenced its response to other comments, which in turn cross-referred to other responses. As with the City's comment, it appears that the Port's response to this specific comment was subsumed by its general response to the overall complaint by the City and the RCTC—that the project would result in more rail traffic, causing greater traffic delays in the City and County of Riverside. (We can find no prohibition on such cross-referencing of comments or responses to comments.)

The Port's analysis determined that the increase in rail traffic due to the project would not have a significant impact on traffic delayed at at-grade rail crossings in the City and County of Riverside. As there was substantial evidence supporting this finding, then it must be true that there would not be a significant impact on other environmental concerns, such as delays experienced by emergency responders, which the City claimed was directly related to the

increase in rail-related delays. The City does not provide any authority for its contention that the increase in delays to emergency responders must be studied and analyzed separately from the analysis of the rail crossing delays.

C.

The final EIR did not fail to discuss air pollution and other impacts from vehicles stopped by trains.

The City argues the Port failed to adequately respond to the City's comment regarding the environmental impact of increased air pollution resulting from cars stopped at rail crossings: "[I]dling vehicles stopped at at-grade crossings contribute 45 tons of air pollutants annually. By 2020, idling vehicles stopped at at-grade crossings will generate 208 tons of air pollutants annually: a staggering 450 percent increase in just 12 years. The Riverside County Department of Health indicates that City of Riverside children, 5-14 years of age, suffer more asthma-related hospitalizations than any other group." As with the preceding argument regarding emergency services, the City's comment letter raises the concern that increased vehicular traffic delays due to the increase in rail traffic from the project will exacerbate air pollution problems. And we again observe that the Port's response to this specific comment was subsumed by its general response to the overall comment that the project would have a significant adverse impact on vehicular traffic delays in the City and County of Riverside.

The Port's analysis determined that the increase in rail traffic due to the project would not have a significant impact on vehicular traffic delayed at at-grade rail crossings in the City and County of Riverside. As there was substantial evidence supporting this finding, then it must be true that there would not be a significant impact on other environmental concerns, such as air pollution, which the City claimed were directly related to the increase in rail-related delays.

D.

The City failed to exhaust the issue of failure to report actual train count data.

The City criticizes the Port for failing to obtain actual train count data from the Union Pacific and Burlington Northern Santa Fe railroads. This argument was neither raised in the administrative proceedings, nor in the trial court, and has therefore been forfeited.

E.

The Port did not err in omitting passenger trains from its analysis.

The City next argues the Port understated rail-related traffic delays by omitting passenger trains from its analysis. The Port excluded passenger trains when collecting data on existing conditions in the City and County of Riverside, because passenger trains do not block grade crossings as long as freight trains do. Therefore, the Port contends, including passenger trains in the analysis for this case would have undercounted rail-related delays caused by the project. Additionally, the Port noted that its expert concluded there was no appreciable difference in terms of the significance of environmental impacts between the RCTC's data (which included passenger trains) and the Port's data (which did not). We find no abuse of discretion in the Port's exclusion of passenger trains from its analysis.

F.

The City failed to exhaust the issue of failure to include gate downtimes when no train is present.

The City argues the Port erred in omitting from its analysis the delays resulting from closed gates at crossings when no train is present. The City failed to raise this issue in the administrative proceedings, or in the trial court. The issue has been forfeited.

VII.

SUBSTANTIAL EVIDENCE SUPPORTS THE PORT'S FINDING THAT THE PROJECT WILL HAVE NO SIGNIFICANT IMPACT ON THE CITY OR COUNTY OF RIVERSIDE.

The City argues there is no substantial evidence to support the Port's findings that (1) the project-specific impact of increased train-induced delays in the City and County of Riverside would not be significant, and (2) the cumulative impact of new train traffic generated by overall port development would not have significant adverse impacts on the City and County of Riverside.

"Challenges to an EIR based on a dispute about the scope of the analysis, the validity of the methodology used, or the accuracy of data it relied on involve factual issues; in those instances, the question for the court is whether the agency's reasons for studying the impact as it did are supported by substantial evidence. [Citations.] [¶] A reviewing court will resolve any disputes regarding the adequacy of the EIR's analysis in favor of the lead agency if there is any substantial evidence in the record supporting the EIR's approach. [Citations.]" (1 Kostka & Zischke, Practice Under the Cal. Environmental Quality Act (Cont.Ed.Bar 2d ed. 2011) § 11.35, pp. 564-565 (rel. 1/11).)

"An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." (Cal. Code Regs., tit. 14, § 15151.)

The lead agency is responsible for determining whether an environmental impact of a proposed project is significant. (Cal. Code Regs., tit. 14, § 15064, subd. (b).)

The City contends that the Port relied on incomplete or insufficient train counts and included nondelayed vehicles in its delay calculations in concluding the impact on the City and County of Riverside would not be significant. The City cites *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 879-880, in which the appellate court affirmed the judgment following the trial court's order granting a petition for a writ of mandate setting aside the certification of a final EIR for an open-air human waste composting facility. The trial court found that the final EIR's finding that the alternative of an enclosed facility was not economically and technically feasible was not supported by substantial evidence, and that the final EIR failed to include a required water supply assessment. (*Ibid.*) As discussed in more detail *ante,* we conclude the Port did not abuse its discretion in basing its analysis on the selected criteria.

The City also argues the Port was required to mitigate the impacts of the project by contributing its fair share to grade separation projects in the City and County of Riverside. CEQA requires that significant environmental impacts from a project be mitigated when feasible. (*City of Marina v. Board of Trustees of California State University* (2006) 39 Cal.4th 341, 369.) The City points to a statement by the Board of Harbor Commissioners in the findings of fact in the final EIR, which the City claims, proves the Port was required to undertake mitigation of rail-related delays in the City and County of Riverside due to the cumulative significant impacts of the project. The findings read, in part: "The only at-grade crossings potentially affected by the proposed Project are at Avalon Boulevard and Henry Ford Avenue. The grade crossing at Fries Avenue would be eliminated as part of the South Wilmington Grade Separation project. Impacts from the proposed Project along with other cumulative projects on the regional rail corridors north of the proposed Project site would not be significant since the Alameda Corridor project has been completed. The completion of the corridor has eliminated the regional at-grade rail/highway crossings between the Port and the downtown rail yards; therefore, there would be no change in vehicular delay at any of those crossings due to proposed Project-related rail activity (they are now all grade separated). Significant cumulative impacts would occur at Avalon Boulevard and Henry Ford Avenue crossings. Cumulatively, there would also be a significant impact on the at-grade rail crossings east of downtown Los Angeles. *This cumulative impact would be due to the overall growth in rail activity* that would occur to serve the added cargo throughput in the Southern California region and the nation."[3] (Italics added.)

The Port discounts this statement as a simple typographical error; the statement does conflict with other findings within the same section of the final EIR: "The Project will not cause significant rail related impacts on lines that lead north or east of the downtown rail yards"; "[S]ignificant vehicle delay impacts at the at-grade crossings in Riverside County (and City of Riverside) are not anticipated. Therefore, no mitigation for such impacts is required."

So we are left with the situation of a final EIR that contains conflicting findings on the key issue before us. Neither party addresses how this court should evaluate such conflicting factual findings. Because of the overall rules for considering challenges to EIR's under CEQA, we consider whether substantial evidence supports the different findings. As explained *ante,* we have determined that substantial evidence supports the Port's findings that the project would not cause significant rail-related delays in the City and County of Riverside.

If the Port correctly determined that there were no significant adverse impacts on the City and County of Riverside due to the project, then the Port had no obligation to consider, much less contribute to, their mitigation.

The City candidly admits that long before the recirculated draft EIR was published for comment, the County of Riverside had analyzed the problems within its community due to delays at at-grade rail crossings, had developed a plan for correcting those problems, and had begun trying to secure funding for its plan.

The Port does not have a "fair share" of Riverside County's mitigation plan, and therefore cannot be faulted for failing to contribute its fair share.

Ultimately, our role as a reviewing court is not to decide whether the Port acted wisely in approving the project. We only determine whether the EIR contained sufficient information about the project and the potential environmental impacts that would arise from the project, so as to allow for an informed decision. (*Eureka Citizens for Responsible Government v. City of Eureka, supra,* 147 Cal.App.4th at p. 378.) We conclude that the EIR was sufficient in this respect, and that the City has failed to meet its burden to show otherwise.

DISPOSITION

The judgment is affirmed. Respondents to recover costs on appeal.

WE CONCUR:

MOORE, ACTING P. J.

IKOLA, J.

[1] TEU stands for 20-foot equivalent unit, which is the typical means for expressing the amount of cargo. The **City's** opening appellate brief includes the following discussion of the TEU's that are anticipated from the project (parenthetical references are the **City's** citations to the administrative record): "With 10 cranes and the expansion of terminal backlands from 11 to 142 acres (6:2869-2870), by 2030 the increased cargo capacity allowed by Phases II and III would accommodate delivery of 838,338 containers per year. (1:6-9; 6:2892.) **C**argo is typically expressed in terms of twenty-foot-equivalent units (TEUs), and each container contains approximately two TEUs. The current Project will make possible more than a threefold increase in container throughput over Phase 1 of the Project, and more than a tenfold increase over levels prior to Phase I. (8:3784.) [¶] The EIR estimates by 2030 the Project would generate 817 annual `roundtrip' rail movements, or 1,634 actual trips in and out of the port. (1:34; 6:2870.) [The Port] estimates that nearly 40 percent of TEUs arriving from overseas at the **C**hina Shipping terminal travel by near-dock and on-dock rail to further destinations. (6:2870.) Furthermore, the 40 percent of TEUs identified as traveling by rail does not appear to include the large percentage of TEUs trucked to railyards to be transferred to rail and ultimately through **Riverside**. (6:2870 [train trips described are only from on-dock and near-dock. It is unclear whether the term `local delivery' includes the delivery of TEUs by truck to the Vernon or East **Los Angeles** rail yards].)"

[2] The Port's response contains a typographical error, where it references table E12.-13; the correct reference is to table E1.2-13. While the error might have caused some confusion, the **City's** December 17, 2008 letter to the Port, regarding the responses to the comments, shows it was able to identify the table to which the Port was referring in its response.

[3] The **City** quotes only the italicized portion of the final EIR's finding.

CITY OF RIVERSIDE, Plaintiff and Appellant,

v.

CITY OF LOS ANGELES et al., Defendants and Respondents.

No. G043651.

Court of Appeals of California, Fourth District, Division Three.

Filed August 11, 2011.

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NOT TO BE PUBLISHED IN OFFICIAL REPORTS

OPINION

FYBEL, J.

INTRODUCTION

The Port of **Los Angeles** prepared an environmental impact statement/environmental impact report (EIR) for a project involving the construction and operation of a container terminal in the West Basin of the Port of **Los Angeles**. The Board of Harbor Commissioners of the **City** of **Los Angeles** approved the final EIR. The **City** of **Riverside** (the **City**) sought a writ of mandate from the trial court, challenging the EIR. The trial court denied the petition for a writ of mandate, and the **City** appeals. (We will refer to respondents the **City** of **Los Angeles**, the **Los Angeles City** Council, the **Los Angeles** Harbor Department, the Board of Harbor Commissioners, and the Port of **Los Angeles** collectively as the Port, for ease of reference.)

Having independently reviewed the administrative record, we conclude the Port did not abuse its discretion in certifying the final EIR, and we therefore affirm the trial court's judgment.

STATEMENT OF FACTS

The project involves the construction of a new wharf, additional cranes, the expansion and development of 142 acres of terminal backlands, and the construction of terminal infrastructure at the Port of **Los Angeles**. In 1997, the Board of Harbor Commissioners certified a program EIR for the West Basin Transportation Improvements Program at the Port of **Los Angeles**. (*Natural Resources Defense Council, Inc. v. City of Los Angeles* (2002) 103 Cal.App.4th 268, 272.) In March 2001, the **City** of **Los Angeles** entered into a lease with China Shipping Holding Co., covering construction of the project as well as later terminal operations. (*Id.* at pp. 277-278.) The **city** council determined that the 1997 EIR covered the project, and that no additional documentation pursuant to the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) was needed. (*Natural Resources Defense Council, Inc. v. City of Los Angeles, supra,* at p. 278.) The Natural Resources Defense Council, Inc., among others, petitioned for a writ of mandate, alleging the **City** of **Los Angeles** violated CEQA by entering into the lease without completing an adequate

EIR. (*Id.* at p. 279.) The trial court denied the petition. (*Ibid.*) On appeal, the court concluded the Port of Los Angeles had failed to prepare a proper EIR, and the environmental review had been improperly segmented. (*Id.* at pp. 284-285.) The Port was ordered to prepare a proper EIR. (*Id.* at pp. 285-286.)

Phase I of the project has been completed. The present matter involves the EIR for phases II and III of the project. The Port released a draft EIR for public comment in August 2006. Numerous comments were received. Based on the comments received, the Port thoroughly revised and expanded the draft EIR for a second round of public review and comment in April 2008 (the recirculated draft EIR).

The City and the Riverside County Transportation Commission (RCTC) submitted comments on the recirculated draft EIR, asserting it had not adequately analyzed impacts to rail and road traffic in the City and Riverside County. The RCTC identified 12 at-grade rail crossings it claimed would be seriously affected by the project. The Port investigated existing conditions at those rail crossings.

In the final EIR, the Port responded to the comments to the recirculated draft EIR, including those by the City and the RCTC. The final EIR found that project-related rail activity would not result in significant traffic delays at rail crossings in the City or in Riverside County.

The Board of Harbor Commissioners held a hearing on the recirculated draft EIR on December 18, 2008. At the end of the hearing, the board unanimously certified the final EIR and approved the project. In its findings, the board concluded that, apart from two rail crossings near the Port of Los Angeles itself, the project would not cause significant rail crossing delay impacts, or contribute to significant cumulative rail crossing impacts. Specifically responding to comments from the City and the RCTC, the final EIR concluded: "The comments from the City of Riverside and RCTC both suggest that the findings in the Recirculated Draft EIS/EIR are not correct and that the proposed Project would cause significant impacts within Riverside from truck and rail traffic in addition to the two local intersections identified in the Recirculated Draft EIS/EIR. Characterizing congestion in Riverside County as caused by the Ports is incorrect and unsubstantiated. Rather, congestion in Riverside County is predominantly a result of land use planning and growth policies and decisions of the jurisdictions within the county."

PROCEDURAL HISTORY

The City filed a petition for a writ of mandate, and complaint for declaratory and injunctive relief, on February 18, 2009. (The case was originally filed in Los Angeles Superior Court, but was transferred to Orange County Superior Court pursuant to a stipulated order.)

The trial court issued a minute order denying the petition for a writ of mandate. The court entered judgment in favor of the Port on April 8, 2010. The City timely appealed.

DISCUSSION

I.

STANDARD OF REVIEW

The parties initially disagree on the standard of review this court must apply. The appropriate standard of review was set forth by the California Supreme Court in *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 426-427: "In reviewing an agency's compliance with CEQA in the course of its legislative or quasi-legislative actions, the courts' inquiry `shall extend only to whether there was a prejudicial abuse of discretion.' [Citation.] Such an abuse is established `if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence.' [Citations.] [¶] An appellate court's review of

the administrative record for legal error and substantial evidence in a CEQA case, as in other mandamus cases, is the same as the trial court's: The appellate court reviews the agency's action, not the trial court's decision; in that sense appellate judicial review under CEQA is de novo. [Citations.]" (Fns. omitted.) In other words, on appeal, we independently review the administrative record to determine whether the Port prejudicially abused its discretion.

"`"`Substantial evidence is defined as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached."'" [Citation.] `"In determining whether substantial evidence supports a finding, the court may not reconsider or reevaluate the evidence presented to the administrative agency. [Citation.] All conflicts in the evidence and any reasonable doubts must be resolved in favor of the agency's findings and decision. [Citation.] [¶] In applying that standard, rather than the less deferential independent judgment test, `the reviewing court must resolve reasonable doubts in favor of the administrative findings and decision.'" [Citations.]" (*Citizens for Responsible Equitable Environmental Development v. City of San Diego* (2011) 196 Cal.App.4th 515, 522-523.)

Our role as a reviewing court is to consider the sufficiency of the EIR as an informational document. (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392.) "A court may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable. [Citation.] A court's task is not to weigh conflicting evidence and determine who has the better argument when the dispute is whether adverse effects have been mitigated or could be better mitigated. We have neither the resources nor scientific expertise to engage in such analysis, even if the statutorily prescribed standard of review permitted us to do so. Our limited function is consistent with the principle that `The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. CEQA does not, indeed cannot, guarantee that these decisions will always be those which favor environmental considerations.' [Citation.]" (*Id.* at p. 393.)

II.

EXHAUSTION OF REMEDIES

The Port argues that many of the arguments raised by the City on appeal were neither raised in the administrative proceeding, nor preserved in the trial court.

Public Resources Code section 21177, subdivision (a) provides: "An action or proceeding shall not be brought pursuant to Section 21167 unless the alleged grounds for noncompliance with this division were presented to the public agency orally or in writing by any person during the public comment period provided by this division or prior to the close of the public hearing on the project before the issuance of the notice of determination."

The purpose of the exhaustion of administrative remedies doctrine is to give the public agency the opportunity to receive and respond to specific factual and legal issues. (*Coalition for Student Action v. City of Fullerton* (1984) 153 Cal.App.3d 1194, 1197-1198. "[T]he exact issue raised in the lawsuit must have been presented to the administrative agency so that it will have had an opportunity to act and render the litigation unnecessary." (*Resource Defense Fund v. Local Agency Formation Com.* (1987) 191 Cal.App.3d 886, 894; see *Citizens for Responsible Equitable Environmental Development v. City of San Diego, supra*, 196 Cal.App.4th at p. 527 ["general, unelaborated objections [are] insufficient to satisfy the exhaustion doctrine"]; *Sierra Club v. City of Orange* (2008) 163 Cal.App.4th 523, 535 ["`"exact issue"' must have been presented to administrative agency in order to exhaust administrative remedies in CEQA case]; *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777, 791 [arguments against plan on same general topic do not save specific statutory argument that was not raised at administrative proceeding level].) If the exhaustion of administrative remedies doctrine applies, a court does not have the discretion to refuse to apply it. (*Azusa Land Reclamation Co. v. Main San Gabriel Basin Watermaster* (1997) 52 Cal.App.4th 1165, 1215-1216.)

The City bears the burden of demonstrating that the issues raised in its appellate briefs were first raised at the administrative proceeding level. (*Sierra Club v. City of Orange, supra*, 163 Cal.App.4th at p. 536.)

An exception to the exhaustion of administrative remedies doctrine applies when the agency fails to provide sufficient opportunity to the public to raise objections to the project. Public Resources Code section 21177, subdivision (e) provides: "This section does not apply to any alleged grounds for noncompliance with this division for which there was no public hearing or other opportunity for members of the public to raise those objections orally or in writing prior to the approval of the project, or if the public agency failed to give the notice required by law." As will be explained *post*, the City cannot establish any lack of notice by the Port, and the City does not claim any lack of a public hearing or lack of an opportunity to provide written comments.

Additionally, the City cannot argue on appeal issues that were not raised in the trial court. (*A Local & Regional Monitor v. City of Los Angeles* (1993) 12 Cal.App.4th 1773, 1804.) This rule, too, is subject to exceptions. An appellate court may consider issues that are pure questions of law, such as whether the EIR was adequate as a matter of law, or whether the issue is one of public interest. (*Woodward Park Homeowners Assn., Inc. v. City of Fresno* (2007) 150 Cal.App.4th 683, 713-714.)

III.

THE PORT'S RESPONSE TO COMMENTS BY THE CITY AND THE RCTC WAS TIMELY.

The City argues the Port failed to comply with the requirements of Public Resources Code section 21092.5, subdivision (a), which provides, in part: "At least 10 days prior to certifying an environmental impact report, the lead agency shall provide a written proposed response to a public agency on comments made by that agency." (See also Cal. Code Regs., tit. 14, § 15088, subd. (b).) The City claims it received the Port's responses to its comments on December 9, 2008, while the EIR was certified fewer than 10 days later, on December 18.

But the administrative record contains a cover letter dated December 5, 2008, under which the response to comments document was sent to all commenting agencies. Additionally, at the final hearing, the director of environmental management of the Port of Los Angeles testified that the Port both mailed and e-mailed the response to comments to the Riverside City Attorney's Office on December 5. The City concedes, in its reply brief on appeal, that the Port's response was mailed 13 days before the hearing. The City argues, without any authority, that the Port failed to meet its obligation because the City did not receive the response until four days later.

We conclude the Port met its obligation to provide a written response to comments at least 10 days prior to certifying the EIR by mailing and e-mailing the response 13 calendar days before the hearing. The City has failed to establish a lack of compliance with the applicable notice requirements.

IV.

THE RECIRCULATED DRAFT EIR DID NOT DEFINE THE AREA AFFECTED BY THE PROJECT TOO NARROWLY.

The recirculated draft EIR identified two at-grade rail crossings near the Port of Los Angeles, which would experience significant, unavoidable impacts from the project. The recirculated draft EIR determined there would be no other negative impacts from the project due to rail-related issues: "[R]ail-related impacts due to the proposed Project are limited to the at-grade crossings that are located south of the downtown rail yards, and are focused on the at-grade crossings on local lines in and near the Port."

The recirculated draft EIR concluded the project would not cause significant rail-related impacts outside the general Port of **Los Angeles** area. "The Project will not cause significant rail-related impacts on lines that lead north or east of the downtown rail yards. Rail trips are not controlled by the Port. Currently, the unit trains built at the on-dock and near dock facilities can be picked up by [Burlington Northern Santa Fe Railway] and/or [Union Pacific]. Both rail companies use the Alameda Corridor to travel to the downtown rail yards. To the east of the downtown rail yards, some of the trains are broken down, reconfigured and otherwise modified at the location of the downtown rail yards from that point to the east. Other trains remain unit trains through the downtown rail yard; there are approximately nine major routes with a number of subroutes that the trains can take to leave the state. The rail operators, and not the Port, make the choice of what routes the trains will take, the day they will move and the time of day the trains will move. Furthermore, the rail mainline tracks were designed and built to accommodate the anticipated rail activity in the region. Rail volumes on the mainline are controlled and limited by the capacity of the mainline itself, thus by definition the project's trains could not traverse the mainline unless it still has remaining capacity. The number of trains generated by the project would not cause the mainline rail tracks to exceed the regional capacity. Once the regional mainline rail track capacity would be exceeded due to increases in regional rail activity, separate environmental studies on the mainline expansion would be undertaken by the rail companies, not by each shipper or carrier generating rail volumes."

The **City** and the RCTC made numerous comments regarding the recirculated draft EIR, all of which were tied to the effect of increased rail traffic. The Port responded to those comments in the final EIR. The **City**, however, argues that the Port erred in its response to those comments. The **City's** arguments in this regard are lengthy and detailed.

Although the **City** does not make this specific argument in its appellate briefs, a theme running through the entirety of its arguments is that the Port erred by failing to consider the rail-related impacts on the **City** and **Riverside** County in the recirculated draft EIR. (This argument was raised specifically in the trial court.) An EIR must include the proper boundaries for a project when determining the environmental impact it might have. "An EIR is required to discuss significant impacts that the proposed project will cause in the area that is affected by the project. [Citation.] This area cannot be so narrowly defined that it necessarily eliminates a portion of the affected environmental setting." (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1216.)

The area considered by the recirculated draft EIR was not too narrowly defined. The recirculated draft EIR considered rail-related impacts in the areas immediately adjacent to the project site, and as far away as the **Los Angeles** rail yards, 20 miles from the project site. This case is distinguishable from the cases cited by the **City**. In *Bakersfield Citizens for Local Control v. City of Bakersfield, supra*, 124 Cal.App.4th at page 1216, the appellate court concluded the EIR's for two retail shopping centers, which were located 3.6 miles apart and shared four arterial roadways, were insufficient for failing to consider the other center when examining the cumulative impacts of each. In *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 724, the appellate court concluded an EIR that described the project site as surrounded by farmland was deficient for failing to consider that the project site was adjacent to the San Joaquin River, a wildlife preserve was nearby, and wetlands might be located on the project site.

"An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (Cal. Code Regs., tit. 14, § 15125, subd. (a).) The California Code of Regulations does not define "vicinity" and no published case appears to have considered the issue. "Vicinity" has been defined as "1: the quality or state of being near: nearness, propinquity, proximity . . . 3: a surrounding area or district: locality, neighborhood . . . ." (Webster's 3d New Internat. Dict. (2002) p. 2550, capitalization omitted.) Another definition for "vicinity" is: "A place near to a place designated, but not adjoining or abutting on it." (Ballentine's Law Dict. (3d ed. 1969) p. 1342.)

The recirculated draft EIR and final EIR included several depictions of the "Project Site and Vicinity," which were limited in scope to the Port of **Los Angeles** and the area immediately around it. No commenter appears to have questioned or criticized the EIR's use of the term "vicinity."

We conclude neither the **City** nor the County of **Riverside** is in the "vicinity" of the project. The Port did not abuse its discretion by failing to include in the recirculated draft EIR an analysis of rail-related impacts on the **City** and County of **Riverside**. Nevertheless, as explained in section VI *post,* in the final EIR, the Port did consider the potential impact of the project in the **City** and County of **Riverside** in its response to the comments of the **City** and the RCTC.

V.

THE CITY FAILED TO EXHAUST ITS REMEDIES REGARDING CHALLENGES TO THE METHODOLOGY USED BY THE PORT IN THE RECIRCULATED DRAFT EIR TO ANALYZE RAIL-RELATED IMPACTS.

The recirculated draft EIR identified the level of significance for traffic delays at railroad crossings as follows: "An increase in rail activity could cause delays to motorists at the affected at-grade crossings where additional project trains would cross and/or where the project would result in additional vehicular traffic flow. The project is considered to have a significant impact at the affected at-grade crossings if the average vehicle control delay caused by the project at the crossing would exceed the Highway Capacity Manual (HCM) threshold for level of service E at a signalized intersection, which is 55 seconds of average vehicle delay."

In its respondent's brief on appeal, the Port explains its methodology of analyzing rail crossing delays as follows: "The AVD [(average vehicle delay)] methodology, and 55-second AVD threshold of significance, work as follows: First, the Port collects data on gate blockage time per passing train (in minutes); average `arrival rate' of vehicles at a crossing (in minutes per road lane); frequency of passing trains at a crossing (per hour); and number of road lanes at a crossing. . . . Using those data, and a formula set out in the EIR, the Port calculates the `total traffic delay' — i.e., the aggregate amount of delay, experienced by the *entire body of vehicles as a whole,* at a given crossing in a given hour, due to the passage of trains. . . . Then, the Port averages `total traffic delay' over the number of vehicles using that crossing in a given hour (whether delayed by a train or not), to identify `average vehicle delay,' i.e., *how much delay is experienced, on average, by each individual vehicle* which uses the crossing in that hour. . . . Finally, the Port compares `average vehicle delay,' expressed in seconds, to a standard, drawn from the HCM, under which a crossing is determined to operate at an unacceptable **LOS** [(level of service)] if average vehicle delay, among all vehicles using a given crossing in the peak traffic hour, is equal to or greater than 55 seconds. . . . [¶] The Port's methodology therefore (1) yields information on how much delay an individual vehicle will experience, on average, at a given rail crossing in a given hour and (2) allows for comparison to a recognized standard for determining the significance of a project's impacts on the operational **LOS** of a roadway intersection."

The RCTC attached to its comment letter a technical review of the recirculated draft EIR's analysis of potential environmental impacts in **Riverside** County. The technical review analyzed the impact of rail-related traffic delays, as well as increased emission of pollutants and traffic delays caused by an increased number of trucks transporting goods from the Port of **Los Angeles**. The technical review noted that the recirculated draft EIR did not identify any potential impacts in **Riverside** County, but made its own finding that an anticipated impact of the project would be "additional freight rail traffic carrying containers through **Riverside** County (particularly the impacts caused by the trains passing through at-grade rail crossings, where traffic is delayed waiting for the trains)." It concluded that the effect of the additional cargo containers carried through **Riverside** County by train due to the increased traffic from the project would result in an increased delay of 36.3 vehicle hours per day. The technical review also identified 12 crossings in **Riverside** County "where the additional container traffic would increase the existing delay by at least one vehicle-hour of delay per day."

The **City** raises numerous challenges to the average vehicle delay methodology in the EIR. These challenges, however, are barred by the **City's** failure to exhaust the issue. The **City** admits this issue was not raised in its comments on the recirculated draft EIR, but argues it did not realize the Port's methodology was an issue until the trial

court hearing on the petition for a writ of mandate. Having thoroughly reviewed the administrative record and the appellate record, we conclude the Port fully and accurately explained its methodology in the recirculated draft EIR. The confusion resulting from a mistaken description of the EIR's methodology in the Port's trial brief does not mean the recirculated draft EIR misrepresented the methodology, so as to relieve the City of its failure to exhaust the issue in the administrative proceedings.

VI.

DID THE PORT PROVIDE ADEQUATE RESPONSES TO THE COMMENTS RAISED BY THE CITY AND THE RCTC?

The City argues that the Port failed to respond to many of the comments raised by the City and the RCTC regarding rail-related environmental impacts from the project, and failed to provide analysis specifically requested by the City. The failure to respond to public comments on a draft EIR can constitute an abuse of discretion by the lead agency. "The Port [of Oakland]'s response fell far short of the `good faith reasoned analysis' mandated by CEQA for responding to significant conflicting information generated by the public. [Citations.] Much information of vital interest to the decision makers and to the public pertaining to toxic air contamination was simply omitted. In other instances, the information provided was either incomplete or misleading. The dispute in this regard goes beyond a disagreement of qualified experts over the reasoned conclusions as to what the data reveals. The EIR failed to acknowledge the opinions of responsible agencies and experts who cast substantial doubt on the adequacy of the EIR's analysis of this subject. The conclusory and evasive nature of the response to comments is pervasive, with the EIR failing to support its many conclusory statements by scientific or objective data. These violations of CEQA constitute an abuse of discretion." (*Berkeley Keep Jets Over the Bay Com. v. Board of Port Cmrs.* (2001) 91 Cal.App.4th 1344, 1371.)

The Port notes that in responding to the comments of the City and the RCTC, the Port conducted a field investigation and analysis of existing conditions at the rail crossings identified by the RCTC. Based on this analysis, the Port concluded there would not be any significant impact to rail crossings in the City and County of Riverside as a result of the project.

In determining whether the Port responded adequately to the comments, we consider whether substantial evidence in the record supports the response. An agency must provide a good faith, reasoned response to public comments on a draft EIR. "The written response shall describe the disposition of significant environmental issues raised . . . . In particular, the major environmental issues raised when the lead agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail giving reasons why specific comments and suggestions were not accepted. There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice." (Cal. Code Regs., tit. 14, § 15088, subd. (c).) The response need not be exhaustive as long as it adequately addresses the issues raised in the comments. (*Towards Responsibility in Planning v. City Council* (1988) 200 Cal.App.3d 671, 683.) A lead agency is "not required to exhaust all suggested testing before EIR certification [citation], particularly since there was expert opinion indicating that further investigation was not necessary. `Just as an agency has the discretion for good reason to approve a project which will admittedly have an adverse environmental impact, it has discretion to reject a proposal for additional testing or experimentation.' [Citation.]" (*Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal.App.4th 74, 102.)

A.

The final EIR did not fail to disclose the basis of train projections, as requested by the City's comments.

The recirculated draft EIR projected 817 annual rail round trips attributable to the project by 2030. The **City's** comment letter complained that the basis for this estimate was not included: "The data and calculations underlying the 817 estimated rail round-trips were not included in the [recirculated draft] EIR or its appendices. There is a passing citation to the `Rail Master Plan and actual Yang Ming rail yard projections' on [the recirculated draft] EIR page 2-2, but those projections are never revealed. There is no way to verify the timeliness, accuracy, applicability, or even the existence of the data. Those data must be included and analyzed in the [recirculated draft] EIR discussions and analysis, or at the very least, as an appendix." The Port's response to this comment reads: "The count of 817 rail round trips required for the projected Project is based on the projected terminal TEU[1] throughput and the percentage of total throughput that would be transported via rail. Please see Table E12.-13 in Appendix E of the Recirculated Draft EIS/EIR."[2]

It is probably self-evident that correct assumptions regarding the estimated increase in rail traffic generated by the project are necessary. Without a reasonable, good faith analysis, the EIR is not proper. And without a realistic estimate of what impact the project might have on the environment, a reasonable, good faith analysis is not possible. Did the Port, in its response to the **City's** comments or in the EIR itself, provide the evidence from which we can conclude the estimates of increased rail traffic are realistic?

The **City** contends that the Port's "failure to disclose the assumptions upon which the projections were based is a fatal flaw in the EIR." Having reviewed the recirculated draft EIR, it appears the Port provided an estimate of the TEU's generated annually by the project (figures that the **City** does not challenge), as well as an estimate of the TEU's that would be distributed to rail yards. Those estimates form the basis for the estimate of the increased number of train trips. Reference to the EIR itself may constitute a satisfactory response to a comment. (*Eureka Citizens for Responsible Government v. City of Eureka* (2007) 147 Cal.App.4th 357, 378.)

The **City** argues the estimate of the percentage of TEU's that would be transported by rail in the EIR is contradicted by two other studies included in the EIR—the EIR prepared for the West Basin Transportation Improvements Program and the Ports of Long Beach/**Los Angeles** Transportation Study. The final EIR for the West Basin Transportation Improvements Program estimates, "[a]pproximately 50 percent of all containers passing through the West Basin terminals are expected to be transported by rail. This assumption is consistent with the *Alameda Corridor Environmental Impact Statement* (Federal Highway Administration, Federal Railroad Administration, and California Department of Transportation 1996) and the Deep Draft Navigation Improvements Project (COE, LAHD 1992)." Although the 50 percent estimate in the West Basin Transportation Improvement Program EIR is more than the 36.5 percent figure used in the EIR for this project, the West Basin program was vastly different in size, and that EIR was prepared 10 years before the EIR in this case. An earlier, different EIR's use of different estimates of rail transportation of containered material does not make the EIR for this project inaccurate or incomplete.

Similarly, the Ports of Long Beach/**Los Angeles** Transportation Study estimates that by 2010, "50 percent of all containers that move through the Ports will be transported by rail to inland destinations via on-dock and off-dock railyards." The purposes of this study, performed in 2001, were to identify potential problems in the transportation system throughout the Port of **Los Angeles** and Port of Long Beach, and develop an implementation plan for addressing any deficiencies in the system. The study was not intended as an environmental review document, and dealt with a much larger area than does the EIR for this project. Its applicability to the present issue is limited, at best.

Moreover, as the Port notes, the Port's additional analysis regarding traffic delays due to increased rail traffic that was performed in the **City** and County of **Riverside** in response to the comments raised by the **City** and the RCTC did not use the rail estimates included in the recirculated draft EIR; the analysis used the RCTC's technical review's estimate that four additional trains per day attributable to the project would pass through **Riverside** and its environs. In its response to the comments, the Port accepted the technical review's assumptions. The Port's reliance on one set of assumptions rather than that contained in other documents does not invalidate the EIR, as long as the assumptions and conclusions on which the Port relied are supported by substantial evidence. (*Laurel Heights Improvement Assn. v. Regents of University of California, supra,* 47 Cal.3d at pp. 392-393.)

The City also argues that the EIR's estimate of rail trips does not account for the EIR's inclusion of an incentive program to promote rail use. Its citation to the administrative record for this factual statement is actually a reference to the initial draft EIR; the City does not cite to any spot in the recirculated draft EIR or the final EIR that includes a reference to an incentive program for the Port of Los Angeles tenants to use rail rather than trucks. We do not find the argument compelling.

Finally, the City argues that the EIR is not clear about whether rail trips from other nonproject areas of the Port of Los Angeles are included in the estimate of rail trips generated by the project. (The Port does not specifically address this argument.) We discern no such lack of clarity. The recirculated draft EIR provides estimates of the increase in container traffic, and the attendant increase in rail-related traffic related to the project.

B.

The final EIR did not fail to address impacts to emergency services.

The City argues the Port failed to adequately respond to its comment that increased rail traffic due to the project would adversely impact the provision of emergency services in the City and County of Riverside. The comment letter stated: "Police, fire and EMT officials reported 491 delays at Riverside's at-grade crossings between 2002 and 2007. Responder delays averaged 3 minutes and were as long as 21 minutes. [¶] In the first half of 2007, Riverside experienced 82 rail-delayed fire trucks and ambulances, for a total of 256 minutes. Each of those minutes can represent life or death. Heart attack survival rates can drop from 7% to 10% for each minute of delay. Brain damage can occur in 3 to 4 minutes. From December 1, 2006 to April 24, 2007, rail delays affected 270 police vehicles, for a total of 1,327 minutes (22.12 hours). Again, those minutes can mean life or death."

The reference to emergency vehicle delays is one of several examples in the City's comment letter of how the project and the increased number of trains attributable to the project will adversely impact the City and County of Riverside. (After stating that "[r]epeated rail-scheduling conflicts result in serious delays in Riverside, and elsewhere," the comment letter reads, "For example," and then lists several bullet points that describe specific problems caused by rail-related delays.) Although the City does not specifically make this point, considering its comment letter in toto, the City was arguing the increase in rail traffic from the project would exacerbate problems with emergency service delays. We therefore reject the Port's argument that this issue was not fully raised or developed by the City.

The problem is that there is no evidence supporting any one of the factual claims made in the City's comment letter. The City apparently provided the Port with a copy of an August 2006 report by the Federal Railroad Administration on the impact of blocked highway and rail grade crossings on emergency response services. That report includes the unassailable finding that "[b]locked crossings . . . can be a particularly serious problem for emergency responders." The report does not include any data or analysis specific to the City or County of Riverside (although, interestingly, it uses the improvements to the Alameda corridor, which are discussed in the EIR, as a case study for dealing with problems of grade crossing delays to emergency responders).

The Port's response to this comment cross-referenced its response to other comments, which in turn cross-referred to other responses. As with the City's comment, it appears that the Port's response to this specific comment was subsumed by its general response to the overall complaint by the City and the RCTC—that the project would result in more rail traffic, causing greater traffic delays in the City and County of Riverside. (We can find no prohibition on such cross-referencing of comments or responses to comments.)

The Port's analysis determined that the increase in rail traffic due to the project would not have a significant impact on traffic delayed at at-grade rail crossings in the City and County of Riverside. As there was substantial evidence supporting this finding, then it must be true that there would not be a significant impact on other environmental concerns, such as delays experienced by emergency responders, which the City claimed was directly related to the

increase in rail-related delays. The City does not provide any authority for its contention that the increase in delays to emergency responders must be studied and analyzed separately from the analysis of the rail crossing delays.

C.

The final EIR did not fail to discuss air pollution and other impacts from vehicles stopped by trains.

The City argues the Port failed to adequately respond to the City's comment regarding the environmental impact of increased air pollution resulting from cars stopped at rail crossings: "[I]dling vehicles stopped at at-grade crossings contribute 45 tons of air pollutants annually. By 2020, idling vehicles stopped at at-grade crossings will generate 208 tons of air pollutants annually: a staggering 450 percent increase in just 12 years. The Riverside County Department of Health indicates that City of Riverside children, 5-14 years of age, suffer more asthma-related hospitalizations than any other group." As with the preceding argument regarding emergency services, the City's comment letter raises the concern that increased vehicular traffic delays due to the increase in rail traffic from the project will exacerbate air pollution problems. And we again observe that the Port's response to this specific comment was subsumed by its general response to the overall comment that the project would have a significant adverse impact on vehicular traffic delays in the City and County of Riverside.

The Port's analysis determined that the increase in rail traffic due to the project would not have a significant impact on vehicular traffic delayed at at-grade rail crossings in the City and County of Riverside. As there was substantial evidence supporting this finding, then it must be true that there would not be a significant impact on other environmental concerns, such as air pollution, which the City claimed were directly related to the increase in rail-related delays.

D.

The City failed to exhaust the issue of failure to report actual train count data.

The City criticizes the Port for failing to obtain actual train count data from the Union Pacific and Burlington Northern Santa Fe railroads. This argument was neither raised in the administrative proceedings, nor in the trial court, and has therefore been forfeited.

E.

The Port did not err in omitting passenger trains from its analysis.

The City next argues the Port understated rail-related traffic delays by omitting passenger trains from its analysis. The Port excluded passenger trains when collecting data on existing conditions in the City and County of Riverside, because passenger trains do not block grade crossings as long as freight trains do. Therefore, the Port contends, including passenger trains in the analysis for this case would have undercounted rail-related delays caused by the project. Additionally, the Port noted that its expert concluded there was no appreciable difference in terms of the significance of environmental impacts between the RCTC's data (which included passenger trains) and the Port's data (which did not). We find no abuse of discretion in the Port's exclusion of passenger trains from its analysis.

F.

The City failed to exhaust the issue of failure to include gate downtimes when no train is present.

The City argues the Port erred in omitting from its analysis the delays resulting from closed gates at crossings when no train is present. The City failed to raise this issue in the administrative proceedings, or in the trial court. The issue has been forfeited.

VII.

SUBSTANTIAL EVIDENCE SUPPORTS THE PORT'S FINDING THAT THE PROJECT WILL HAVE NO SIGNIFICANT IMPACT ON THE CITY OR COUNTY OF RIVERSIDE.

The City argues there is no substantial evidence to support the Port's findings that (1) the project-specific impact of increased train-induced delays in the City and County of Riverside would not be significant, and (2) the cumulative impact of new train traffic generated by overall port development would not have significant adverse impacts on the City and County of Riverside.

"Challenges to an EIR based on a dispute about the scope of the analysis, the validity of the methodology used, or the accuracy of data it relied on involve factual issues; in those instances, the question for the court is whether the agency's reasons for studying the impact as it did are supported by substantial evidence. [Citations.] [¶] A reviewing court will resolve any disputes regarding the adequacy of the EIR's analysis in favor of the lead agency if there is any substantial evidence in the record supporting the EIR's approach. [Citations.]" (1 Kostka & Zischke, Practice Under the Cal. Environmental Quality Act (Cont.Ed.Bar 2d ed. 2011) § 11.35, pp. 564-565 (rel. 1/11).)

"An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." (Cal. Code Regs., tit. 14, § 15151.)

The lead agency is responsible for determining whether an environmental impact of a proposed project is significant. (Cal. Code Regs., tit. 14, § 15064, subd. (b).)

The City contends that the Port relied on incomplete or insufficient train counts and included nondelayed vehicles in its delay calculations in concluding the impact on the City and County of Riverside would not be significant. The City cites *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 879-880, in which the appellate court affirmed the judgment following the trial court's order granting a petition for a writ of mandate setting aside the certification of a final EIR for an open-air human waste composting facility. The trial court found that the final EIR's finding that the alternative of an enclosed facility was not economically and technically feasible was not supported by substantial evidence, and that the final EIR failed to include a required water supply assessment. (*Ibid.*) As discussed in more detail *ante*, we conclude the Port did not abuse its discretion in basing its analysis on the selected criteria.

The City also argues the Port was required to mitigate the impacts of the project by contributing its fair share to grade separation projects in the City and County of Riverside. CEQA requires that significant environmental impacts from a project be mitigated when feasible. (*City of Marina v. Board of Trustees of California State University* (2006) 39 Cal.4th 341, 369.) The City points to a statement by the Board of Harbor Commissioners in the findings of fact in the final EIR, which the City claims, proves the Port was required to undertake mitigation of rail-related delays in the City and County of Riverside due to the cumulative significant impacts of the project. The findings read, in part: "The only at-grade crossings potentially affected by the proposed Project are at Avalon Boulevard and Henry Ford Avenue. The grade crossing at Fries Avenue would be eliminated as part of the South Wilmington Grade Separation project. Impacts from the proposed Project along with other cumulative projects on the regional rail corridors north of the proposed Project site would not be significant since the Alameda Corridor project has been completed. The completion of the corridor has eliminated the regional at-grade rail/highway crossings between the Port and the downtown rail yards; therefore, there would be no change in vehicular delay at any of those crossings due to proposed Project-related rail activity (they are now all grade separated). Significant cumulative impacts would occur at Avalon Boulevard and Henry Ford Avenue crossings. Cumulatively, there would also be a significant impact on the at-grade rail crossings east of downtown Los Angeles. *This cumulative impact would be due to the overall growth in rail activity* that would occur to serve the added cargo throughput in the Southern California region and the nation."[3] (Italics added.)

The Port discounts this statement as a simple typographical error; the statement does conflict with other findings within the same section of the final EIR: "The Project will not cause significant rail related impacts on lines that lead north or east of the downtown rail yards"; "[S]ignificant vehicle delay impacts at the at-grade crossings in Riverside County (and City of Riverside) are not anticipated. Therefore, no mitigation for such impacts is required."

So we are left with the situation of a final EIR that contains conflicting findings on the key issue before us. Neither party addresses how this court should evaluate such conflicting factual findings. Because of the overall rules for considering challenges to EIR's under CEQA, we consider whether substantial evidence supports the different findings. As explained *ante,* we have determined that substantial evidence supports the Port's findings that the project would not cause significant rail-related delays in the City and County of Riverside.

If the Port correctly determined that there were no significant adverse impacts on the City and County of Riverside due to the project, then the Port had no obligation to consider, much less contribute to, their mitigation.

The City candidly admits that long before the recirculated draft EIR was published for comment, the County of Riverside had analyzed the problems within its community due to delays at at-grade rail crossings, had developed a plan for correcting those problems, and had begun trying to secure funding for its plan.

The Port does not have a "fair share" of Riverside County's mitigation plan, and therefore cannot be faulted for failing to contribute its fair share.

Ultimately, our role as a reviewing court is not to decide whether the Port acted wisely in approving the project. We only determine whether the EIR contained sufficient information about the project and the potential environmental impacts that would arise from the project, so as to allow for an informed decision. (*Eureka Citizens for Responsible Government v. City of Eureka, supra,* 147 Cal.App.4th at p. 378.) We conclude that the EIR was sufficient in this respect, and that the City has failed to meet its burden to show otherwise.

DISPOSITION

The judgment is affirmed. Respondents to recover costs on appeal.

WE CONCUR:

MOORE, ACTING P. J.

IKOLA, J.

[1] TEU stands for 20-foot equivalent unit, which is the typical means for expressing the amount of cargo. The **City's** opening appellate brief includes the following discussion of the TEU's that are anticipated from the project (parenthetical references are the **City's** citations to the administrative record): "With 10 cranes and the expansion of terminal backlands from 11 to 142 acres (6:2869-2870), by 2030 the increased cargo capacity allowed by Phases II and III would accommodate delivery of 838,338 containers per year. (1:6-9; 6:2892.) **C**argo is typically expressed in terms of twenty-foot-equivalent units (TEUs), and each container contains approximately two TEUs. The current Project will make possible more than a threefold increase in container throughput over Phase 1 of the Project, and more than a tenfold increase over levels prior to Phase I. (8:3784.) [¶] The EIR estimates by 2030 the Project would generate 817 annual `roundtrip' rail movements, or 1,634 actual trips in and out of the port. (1:34; 6:2870.) [The Port] estimates that nearly 40 percent of TEUs arriving from overseas at the **C**hina Shipping terminal travel by near-dock and on-dock rail to further destinations. (6:2870.) Furthermore, the 40 percent of TEUs identified as traveling by rail does not appear to include the large percentage of TEUs trucked to railyards to be transferred to rail and ultimately through **Riverside**. (6:2870 [train trips described are only from on-dock and near-dock. It is unclear whether the term `local delivery' includes the delivery of TEUs by truck to the Vernon or East **Los Angeles** rail yards].)"

[2] The Port's response contains a typographical error, where it references table E12.-13; the correct reference is to table E1.2-13. While the error might have caused some confusion, the **City's** December 17, 2008 letter to the Port, regarding the responses to the comments, shows it was able to identify the table to which the Port was referring in its response.

[3] The **C**ity quotes only the italicized portion of the final EIR's finding.

SUPERIOR COURT OF CALIFORNIA,
COUNTY OF ORANGE
CIVIL COMPLEX CENTER

MINUTE ORDER

Date: 03/10/2010 Time: 01:43:00 PM Dept: CX103

Judicial Officer Presiding: Ronald L. Bauer
Clerk: Janet E Frausto
Reporter/ERM: Nonr
Bailiff/Court Attendant: Ann E. Sayne

Case No: **30-2009-00123216-CU-WM-CXC** Case Init. Date: 05/18/2009
Case Title: **City of Riverside v. City of Los Angeles**

Case Category: Civil - Unlimited Case Type: Writ of Mandate

EVENT ID/DOCUMENT ID: 70934995
EVENT TYPE: Under Submission Ruling

APPEARANCES

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30 2009 00125994 CITY OF RIVERSIDE VS CITY OF LOS ANGELES

No appearances.

The Court having taken this case under submission on 11/3/2010, now rules as follows:

The Respondents City of Los Angeles and related entities ("Respondent" or "Los Angeles") plan an expansion of their port facilities for the receipt and transshipment cargo containers. Petitioner City of Riverside ("Petitioner" or "Riverside") contends that this port expansion will effect a significant diminution of the environmental quality within Riverside, which the Respondent has not adequately addressed in its Environmental Impact Report for the project. The linkage between the port work and Riverside requires several steps: the port expansion will increase the amount of containerized cargo arriving there; in turn, there will be more railroad cars leaving the port; that increased number of railcars will yield more and/or longer freight trains exiting the main Los Angeles rail yards headed for various destinations across the country; ninety percent of those trains leaving Los Angeles use the eastbound mainline that traverses Riverside; increased rail traffic through Riverside will result in more and longer traffic stoppages at the 27 grade crossings within Riverside; these stoppages will adversely impact Riverside.

The presence of so many links between the Port and Riverside has emboldened the Respondent to

suggest that that it can ignore any problem perceived by the Petitioner. Los Angeles dismisses Riverside's concerns as "speculative" and argues that Petitioner "fails to show that the Port was required to analyze Project-related impacts in Riverside" and that the "impacts of Project-related rail traffic were too tenuous and speculative to require evaluation." Opposition Brief page 8, lines 12-14. In particular, Respondent has argued that the activities at two large railroad yards in Los Angeles represent a sort of superseding cause that breaks any chain of causation extending from the Port to Riverside. Thus, Respondent says, the rearrangement of railcars coming from the Port into new consists heading east through Riverside occurs under the exclusive control of the carriers - Burlington Northern Santa Fe and Union Pacific - and absolves Los Angeles from responsibility for its activities at the Port.

Wisely, the Respondent did not cling too tightly to that position. As noted in its brief, "the Port nevertheless undertook a closer look at the issue" despite its claim that the entire issue was "too speculative to analyze." Opposition Brief page 10, lines 10-11. A rock dropped into a smooth pond can cause ripples on distant shores. Here, each of the links between the Port and Riverside is factually demonstrable. None of them is speculative. No one can seriously suggest that this expansion of the Port will not result in more or longer trains crossing Riverside. The increased amount of imports will not all be absorbed in Los Angeles County. The added cargo containers will not be stacked to the sky on the railcars. There is no evidence in the record that the freight trains through Riverside will now accelerate enough to compensate for any increased length and thus result in the same duration of each crossing of a street.

Once we move beyond the notion that the Port expansion will have no effect in Riverside, we can consider the extent of that impact. The Respondent now more accurately reflects the proper issue by reporting its conclusion "that no significant traffic delays were likely on the rail lines leading away from the Los Angeles rail yards" and that "no Project-related significant traffic delays at rail crossings beyond the rail yards were foreseeable." Opposition Brief, page 9, lines 8-9 and 19-20. In fact, the court has concluded that, despite some artless missteps along the way, the Respondent's analysis of this project's distant impacts has been adequate and that its conclusions quoted above are justified.

Respondent undertook a reasonable and reasoned analysis of the potential impact upon Riverside of the Port expansion. This was not the study that the Petitioner would prefer, nor need it be. It did not reach the same conclusions urged by the Petitioner, nor need it. And it was not flawless, nor need it be. At the oral argument in this matter, the court commented upon the rather odd way in which Respondent contended that it had calculated "a *maximum* average delay of 6.2 seconds per vehicle delayed." Page 11, line 22 ½. This seemed to be the result of either funny mathematics or inept grammar.

But there are facts which justify the Respondent's conclusions here. Periodic observations over a five-day period of the rail traffic at twelve critical rail crossings established some basic figures about the number of trains and the average duration of crossing closures. It is known that an average of 128 trains now traverse Riverside each day, and it is projected that the Port project will result in the transit of an additional four trains per day. While the Respondent moved from this information to its puzzling conclusion of "6.2 seconds per vehicle delayed," its general conclusion of an insignificant impact is justified. (The Petitioner has variously suggested an increase of four trains per day or six trains per day.) Indeed, it might be argued that no other conclusion could follow from a 3% increase in rail traffic.

By contrast, the Petitioner's analysis was less persuasive. All figures about this project's potential impact upon Riverside are necessarily speculative, but the court has concluded that the Respondent's analysis is supported by known figures and reasonable estimates of future events.

Lurking in the background of this entire case is the question of whether any increase in Riverside rail traffic is caused by this Port expansion. The court can surely take judicial notice that the population of the Inland Empire has increased significantly in recent years. There are more children in Riverside (and

San Bernardino and Barstow) wearing clothes from Bangladesh. There are more households in Riverside buying refrigerators made in the Republic of Korea. These and other products are going to be delivered to, and through, Riverside even if there is no Port expansion. Whether they enter this country at Long Beach or Port Hueneme or Oakland, or even if they sit in the Los Angeles harbor waiting to unload, they will ultimately find their way to customers in Riverside. Those new residents of Riverside, and of points east, are the direct cause of increased traffic on the streets and rails of Riverside. The Petitioner would have them pay this cost through increased Port charges that would likely be passed on to the shippers and, ultimately, to the purchasers in Riverside. In view of the relative insignificance of any impact that the Port expansion will have upon Riverside rail crossings, it seems more appropriate for the cost of Riverside's grade separation project to be assessed directly upon the resident rate payers and purchasers within that City. This last paragraph forms no part of the court's legal reasoning for its decision, but is merely its rambling musings on the subject.

Petitioner contends that it did not get the requisite ten days to study the Respondents final comments before the last hearing on the environmental review. The evidence in the record does not support that argument. The better and contrary evidence is summarized at page 29, lines 16-22 of the Respondent's Brief and is supported by Dr. Appy's testimony referenced there.

This Petition is denied. This minute order is intended to constitute the court's statement of decision, pursuant to the provisions of California Rules of Court rule 3.1590(c), unless any party timely and properly requests a further statement.

CLERK'S CERTIFICATE OF MAILING: I certify I am not a party to this cause, over age 18, and a copy of this document was mailed first class postage, prepaid in a sealed envelope addressed as shown, on , at Santa Ana, California.
ALAN CARLSON/Executive Officer & Clerk Of The Superior Court, by: Janet Frausto deputy.

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I hereby certify the foregoing instrument consisting of 3 page(s)
is a true and correct copy of the original on file in this court.

ATTEST (DATE) APR 0 5 2010
ANN CARLSON, EXECUTIVE OFFICER AND CLERK OF THE
SUPERIOR COURT OF CALIFORNIA, COUNTY OF ORANGE

BY _____, DEPUTY

EUGENE SHVETSKY

IN-TRANSIT CONTROL OF COAL DUST FROM UNIT TRAINS

by

Claudio Guarnaschelli, Ph.D., P.Eng.

Environmental Protection Service

Fisheries and Environment Canada

Report Number EPS 4-PR-77-1

May, 1977

ABSTRACT

Effectiveness of chemical binders in controlling coal dust emanating from unit trains was investigated and monitored during 1974 and 1975. The parameters investigated included loading profile, type of chemical binder and spraying technique. A flat loading profile provided maximum retention of binder crust and simplicity of spray application. Oil products were the most effective binders. Almost equally effective were the oil and asphalt emulsions. Latex type chemicals formed brittle crusts that were easily fractured by torsional movement of the cars. A combination of simultaneous flooding and spraying was the most effective technique applied during the study. Coal trains from four mines were monitored for crust retention by measuring the percentage of crust cover remaining over the total car surface when the unit trains reached the terminals. Coverages of up to 95% were obtained; however, the crust coverages which most frequently occurred varied from 86% to 90%, 76% to 80%, 81% to 85% and 61% to 65%, depending on loading profile, type and concentration of chemical binder.

RÉSUMÉ

En 1974 et 1975, on a étudié et contrôlé l'efficacité de certains liants chimiques à éliminer la poussière de charbon se dégageant des trains intégraux. Les paramètres examinés comprenaient le profil de charge, le type de liant chimique et la technique d'arrosage. Le profil plat donnait à la croûte de liant une résistance maximale en même temps qu'il simplifiait l'application. Les produits huileux se sont révélés les liants les plus efficaces et les émulsions d'asphalte ont donné des résultats presque aussi valables. Les produits chimiques à base de latex formaient une croûte cassante que le mouvement de torsion des wagons brisait facilement. C'est le procédé combinant un jet de saturation et l'arrosage superficiel qui s'est révélé le plus efficace. En contrôlant les trains provenant de quatre mines, les techniciens ont mesuré l'adhésion de la croûte qui s'exprime en pourcentage de celle-ci demeurée intacte lorsque le train arrive à destination. Ils ont ainsi mesuré des couches protectrices intactes atteignant 95 p. 100 de la surface. Toutefois, les croûtes superficielles le plus souvent observées ont varié de 86 à 90 p. 100, de 76 à 80 p. 100, de 81 à 85 p. 100 et de 61 à 65 p. 100 en fonction du profil de la charge ainsi que du type et de la concentration du liant chimique.

ACKNOWLEDGEMENTS

The author of this report wishes to express his appreciation for the considerable assistance received from the members of the project committee: Mr. L.J. Cherene, Manager of Environmental Services, Kaiser Resources Ltd.; Mr. D.J. di Biasio, Staff Assistant, Fording Coal Limited; and Mr. W. Mummery, Assistant Superintendent, Canadian Pacific Rail.

Recognition is also given to B.H. Levelton and Associates Ltd. for their assistance during the monitoring program, and to numerous staff of the mining companies who provided invaluable technical advice.

Specialized technical assistance was also freely given by staff of other Federal agencies, particularly Mr. Sam Payne of the Canadian Transport Commission for his monitoring work, and by my colleagues in the Environmental Protection Service.

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IN-TRANSIT CONTROL OF COAL DUST FROM UNIT TRAINS

1 CONCLUSIONS

(a) Results of the field studies proved that some chemical binders offered an immediate and satisfactory solution to controlling coal dust emanation from en route unit trains.

(b) Coal Spray 100 and Reclamation Oil were the most effective products used to control dust, principally because their regenerative properties were capable of sustaining a cohesive crustal cover which overcame surface cracks caused by torsional stresses of moving rail cars.

(c) Oil emulsion (DS200) and asphalt emulsions (DS100) produced 85% crustal coverage, which met acceptable government and operating mining company criteria.

(d) Properly formulated latex binders used on horizontal surfaces were as effective as oil emulsions, but on sloped surfaces they were less efficient.

(e) The Study Committee had postulated that crustal deficiencies on irregular coal surface profiles may be overcome if increased spraying on sloped surfaces was applied by an improved spraying method. The field test and observed results did not substantiate this theory, particularly in the case of latex products. These compounds are brittle after the curing period and do not re-polymerize on the surface of the coal cars.

(f) Complete dust control depends on a spraying technique which provides complete and controllable spreading of the binder, adequate quantities and concentrations of applied

chemical (gallons/car), the use of acceptable and readily available chemicals to the mining industry, and loading techniques which form flat loading profiles.

(g) Extensive monitoring confirmed that when latex products are used, crustal retentions of 85% can be readily achieved if the coal surface configuration is a central horizontal plane bounded by limited sloped ends. Crustal retention can be increased to 95%, if the front-end slope is made level with the horizontal central portion.

2 INTRODUCTION

2.1 Objectives

The study was designed to evaluate chemical methods of eliminating or minimizing wind dispersion of coal dust from open-top rail cars during transportation of coal from mine sites to terminal storage areas. Dust control techniques were to be tested and developed which would be economically acceptable and readily adaptable by mining and railway companies. In addition, the establishment of sound, proven control technology would become available to legislators as guidelines in formulating any necessary environmental control regulations.

2.2 Environmental Concerns

The clouds of wind-blown dust that emanate from moving trains are receiving considerable attention as an environmental issue in many countries. In Canada, concern about the air-borne transport and deposition of coal dust has been expressed by the public as numerous complaints to railway companies, operating mines, municipalities, Members of Parliament and government agencies. Supportive evidence in newspaper articles has also highlighted the pollution aspects.

Figure 1 illustrates the geographical range and monthly frequency distribution of complaints in the study area of British Columbia during 1972 - 1973. The peak of complaints during March to May, possibly reflects the public's tendency to object prior to the onset of the summer outdoor season, a time when their awareness of air-borne dust becomes more acute. Also, moisture deficient coal transported during dry months has lower compaction rates and is more susceptible to wind dispersion than during the wetter months of fall and winter. Evidence of this was observed following compaction tests* on a unit train where only 58% of total compaction had occurred after transportation of 180 miles.

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*Kaiser Resources, Internal Report

Physically, coal is black, nontransparent and relatively lightweight. In populated areas its black colour soils houses, swimming pools, terraces and clothing. The nontransparency creates highway hazards by reducing visibility, while its lower density makes it readily airborne and capable of being carried further than common silicate dust.

From a chemical viewpoint, coal mined in Western Canada has not been demonstrated to be acutely toxic to salmonids. Bioassays conducted by B.C. Research proved that liquid extracts from East Kootenay coal are acutely nontoxic to fish.[1]

Pollution by coal dust, then appears to be confined to some aesthetic values and to physical hindrance where excessive quantities of coal are deposited.

2.3 Coal Transportation in the Study Area

Coal is transported to British Columbia terminals by Canadian National Railways (CNR) and by Canadian Pacific Rail (CPR). CNR moves coal from two major mines located in Alberta (McIntyre Mines Limited and Cardinal River Coal) to Neptune Terminals Ltd. in North Vancouver. CPR transports coal from the East Kootenay (Kaiser Resources Ltd. and Fording Coal Ltd.) to Westshore Terminal, the superport at Roberts Bank in the Municipality of Delta.

Figure 1 shows the major coal mine locations and railway routes to the Vancouver terminals. During 1973, 11,303,539 short tons of coal were transported over the railway system, 8.3 million tons by CPR and approximately 3 million by CNR. Table 1 details the coal movements to British Columbia terminals during 1973. Future coal industry development will greatly increase the tonnages transported, particularly from the northeastern area of British Columbia. Such development will emphasize the need for effective en route coal dust control.

3 THE STUDY PROGRAMME

In February 1974, a committee of representatives from Kaiser Resources Ltd., Fording Coal Ltd., Canadian Pacific Rail and the Federal Government formulated a study and test programme to determine the relative effectiveness of available chemical binders as an immediate solution to the problem of coal dust control on moving unit trains.

3.1 Phase I - Planning and Preliminary Field Investigations (During 1974)

(a) Planning involved technical and logistic considerations to determine the following:

- The most economical and effective location to apply chemical spraying.
- The minimum number of rail cars per train required to obtain a conclusive test programme.
- The number and types of tests to be conducted to obtain base data for Phase II.
- Allocation of test sites, based on in-transit settling characteristics, where tests would be carried out.
- What test evaluation procedures and criteria would yield reliable data.
- Preliminary screening and assessment of available chemical products to be used in the field test work.

(b) Field Work

Initially, spraying locations other than the mine sites at Fort Steele, were considered to evaluate the possible advantages of spraying after coal compaction had taken place. Eventually all trains were sprayed at the mine sites (Kaiser and Fording) to avoid all pollution problems.

Each chemical product was tested on a maximum of five cars, with each car selected on the basis of representative profile and location at, or near, the head-end of the train, to avoid possible accumulation of coal dust escaping from other cars. Binding performance at the departure point, at Kamloops, and at the Vancouver terminal was recorded by each committee member on a Visual Observation Form (see Table 2). The final rating for each series of tests reflecting the opinion of the total *group* was recorded on Tables 3 to 10.

3.2 Phase II - Extension of Field Investigations to Complete Unit Trains

In order to confirm the test results and analyses obtained in the limited (five cars per train) Phase I work, B.H. Levelton and Associates Ltd. were contracted by Environment Canada to carry out control tests on complete unit trains during the period August 28th to September 30th, 1975. A synopsis of Levelton's report entitled, "Measurement of Crust Remaining on the Surface of Coal Cars on Arrival at Dumping Terminals - Results of Monitoring 30 Trains", is presented in Sections 9 and 10 of this report.

4 COAL LOSSES BY WIND FROM UNTREATED CARS

Early in the study it became evident that the loading profile, that is, the geometrical configuration of the exposed surface of the coal, had a large influence on the coal lost in transit (Plate 1). Beshketo[2] reported heavy losses of coal at high train speeds. According to his data, the best "hood" height, based on car capacity and winds losses, is 200 mm (8") above the sill of the coal cars (Figure 2). He observed that 6 mm of coal was lost at 60 km/h (40 mph) and 13 mm (1/2") lost at 100 km/h (approx 60 mph). A parallel study on dust losses from mineral concentrates was carried out by Schwartz.[5] He observed

that losses from concentrates were up to 2.1% for speeds up to 60 mph.

Screen analyses of the various coals transported to British Columbia terminals are presented in Figure 3. Even though the coal from Alberta is somewhat coarser than the coal from British Columbia, both types readily become airborne at low speeds.

Exact measurements of coal losses during transportation were difficult to determine with a high degree of confidence. Some problems experienced during the study included: inconsistencies in weigh scale calibration, variations of existing moisture content of the coal, addition of flying debris deposited in cars en route, and the inclusions of rain and/or snow. Thus calculations of coal lost en route as a measurable difference between car weight at the departure point and its weight at the terminal were somewhat unreliable.

Previous studies[2 and 3] suggest losses in the order of 1.5 tons/car or 1.5% for a 100-ton car capacity. Even if we assume that losses of western coal are only 0.5% or 1/2 ton/car per 700 mile journey, it is relatively easy to justify a reasonable expenditure to keep coal in the cars and, at the same time, reduce public concern over pollution.

In economic terms, prevention of the assumed Western Canada coal losses represent a saying, based on $60/ton of $30/car or over $3 million annually.

5 LOADING PROFILE

5.1 Effects on Crust Retention During Transit

Loading profiles had a profound influence on crust retention (Plates 1, 2). A surface particle is affected by the vertical force of gravity and by horizontal forces of linear and centrifugal acceleration

and/or deceleration. The magnitude of each component depends on whether the particle rests on a horizontal surface or on an inclined plane and on the resistance to shear offered by the substrate. Furthermore, if the independent particle is chemically bound to other surface particles, the strength of the chemical bond is an additional force that increases the particle's resistance to sliding.

During the field tests it was soon realized that a totally flat surface would produce the most desirable profile (Plates 3, 4). Coverage of the flat portion of the car never presented a serious problem, suggesting that the effects of acceleration and deceleration of the train were negligible compared to the resistance offered by the substrate. The only evidence of failure was the appearance of surface cracks induced by torsional and vibrational stresses to which the cars were subjected during transportation.

5.2 Influence of Loading Method

In practice, the operation of a single loading chute always produced a sloped end at each end of the car (Plates 5, 6). On these slopes, the larger the horizontal component of the opposing force the more stable the system became. At the natural angle of repose where all forces were in balance, any minor disturbance due to acceleration or deceleration of the cars was sufficient to cause failure. To increase crust stability the angle of repose would be decreased at least by the expected maximum acceleration or deceleration of the cars. If this cannot be achieved, then, the strength of the chemical bond within the binder must accommodate the impact of these accelerations plus any torsional or vibrational components.

6. CHEMICAL BINDERS EVALUATED IN PHASE I

A chemical spray is more effective if it shows an affinity for the material on which it is sprayed and if the product (eg. coal) does

not slump after the application (Plate 10). Coal readily absorbs oils without any prior surface treatment (lipophilic property) but repels water (hydrophobic property). In the case of emulsions, where water is the continuous phase, wetting of the surface can occur only if the surface has been pretreated with a solution containing a surface-active agent, or if there are sufficient quantities of a fast acting surfactant within the formulation.

Papic and McIntyre[4] tested 83 surfactants to evaluate their ability to improve the wetting of coal by water. Their findings showed that nonionic surfactants of the alkyl-phenylpolyethoxy ether type were the best wetting agents.

During the study the following chemical binding products, with or without the addition of specific surfactants, were tested:

(a) Dowel M167, a latex product by Dowell of Canada.

(b) Alchem 63026, a latex product by Alchem Limited.

(c) Dust Suppressant 100, an asphalt emulsion produced and marketed by Pounder Emulsions Limited.

(d) Dust Suppressant 200, an emulsified petroleum residue produced and marketed by Pounder Emulsions Limited.

(e) Acquatain, a product marketed by Whitlock Construction.

(f) Lignin Derivatives, an experimental product by Cominco.

(g) Coal Spray 100, an oil preparation by Imperial Oil Limited.

(h) Reclamation Oil, a product tested by Cominco.

6.1 Oil and Emulsion Test Results and Comments

Oil sprays and emulsions were the most effective binders (Plates 7, 8, 9). The success of the binders was attributed to the production of a flexible crust, high viscosity and an inherent ability to regenerate their surface. In other words, the stability of the product prevented the formation of a rigid crust by reacting neither with the coal particles nor with the atmosphere. The cohesive forces of the oil phase were enhanced by the lipophilic character of the coal which facilitated spreading of the oil on the coal surface. In this case the oil-coated particles adhered to each other forming a porous and oozy top layer. The same mechanism was operative in regenerating the top layer of the crust whenever a surface crack was produced by vibrational and/or torsional movement of the cars or by settling of the coal. The oils and emulsions were the only products to display this regenerative property.

Some of the disadvantages of using oils included the adverse effects on rubber conveyor belts and the possibility of washing residual oil and/or additives into adjacent water bodies.

Tables 3, 4, 5 and 6 present a summary of the detailed analysis and results of oil and emulsion tests obtained by each participant and previously recorded on Visual Observation Forms - Phase I (See Table 2).

Table 3 shows results for Coal Spray 100; Table 4, Reclamation Oil; Table 5, Dust Suppressant 100; and Table 6, Dust Suppressant 200.

Table 11 is an overall summary based on the best tests from the above tables, and includes the rating and the degree of acceptability of all the products.

6.2 Other Binding Products, Test Results and Comments

The main disadvantage of latex is its brittle crust. Vibra-

tional and torsional movements cracked the surface polymer and patches of polymerized latex were easily removed or displaced by wind (Plate 2). Adherence of the crust to the substrate was minimal, and therefore, the best retention occurred on horizontal surfaces (Plates 10, 11, 12). Because the well polymerized and chemically stable crust of latex products is not water soluble, leaching is unlikely to take place, and therefore, pollution of adjacent water bodies will not occur.

Lignin derivatives, which are strong wetting agents, formed a thick crust which will dissolve readily in water. Following excess rainfall, the lignin derivatives were transported into the bulk of the coal in the cars, and the remaining washed unconsolidated coal behaved as untreated coal in that coal dust became airborne.

Tables 7, 8, 9 and 10 present a summary of the detailed analysis and results of latex and Lignin Derivatives products obtained by each participant and previously recorded on Visual Observation Forms - Phase I (see Table 2). Table 7 shows results for Dowell M167; Table 8, Lignin Derivatives; Table 9, Aquatain; and Table 10, Alchem 63026. Table 11 is a summary based on the best tests from the above tables, and includes the rating and the degree of acceptability of all the products.

7 SPRAYING METHODS

The difficulties of retaining a crust on the surface slopes necessitated an investigation of spraying techniques. Two mechanical techniques were tried: (a) preferential spraying, and (b) a combination of flooding and spraying.

Preferential spraying is the uneven application of chemical binders to different parts of the exposed surface (Plates 13, 14, 15). The slopes were sprayed more than the horizontal surfaces. This technique has been used with moderate success and will continue to be applied when fast and complete wetting can be achieved without binder run-off.

To increase binder retention on slopes, Fording Coal Ltd. devised a penetration-spray system designed to achieve not only maximum penetration and thickness but also an adequate surface coverage (Plates 17, 18). The system employs an oscillating spray bar equipped with nozzles capable of open-orifice discharge and fan spraying. The open-orifice discharges are designed to prevent run-off of the emulsion and the formation of a thick crust by increasing binder penetration. The fan sprays are designed to provide a more uniform and adequate coverage of the surface layer. Using this system, Fording Coal Ltd. demonstrated that undesirable slopes could be stabilized almost entirely (Plates 19, 20).

8 SPRAYING REQUIREMENTS

The major coal companies operating in Western Canada, in direct response to public concern about the coal dust pollution problem and their agreement with the findings of this report, volunteered to apply reasonable measures to control the coal dust emanating from moving trains. As of July 1, 1974, all major mining companies sprayed every train leaving their property.

Unfortunately, not all of the chemical binders offered adequate protection. Industrial and Federal representatives agreed that the single parameter that best describes the effectiveness of the various chemical binders is the residual surface coverage measured at the terminals. Assuming that coal dust originates uniformly from every part of the exposed surface, then effective surface coverage is the only parameter that is directly proportional to the coal dust generated in transit.

The mining companies agreed with the standards presented in Phase I of this report that a minimum of 85% of the surface would be covered immediately and furthermore, that a 90% coverage should be achieved by October 1975.

9 PHASE II FIELD MONITORING

Sections 9 and 10 present a synopsis of the B.H. Levelton and Associates' study. The spraying techniques and methods of crust retention observation and recording were founded on the basis of the Phase I work. In the Levelton study, the range of tests were extended to include complete unit train protection and to assess the coverage resulting from mine optimization of chemical binder required to produce an 85% cover. Table 12 shows the number of trains and cars monitored.

9.1 Coal Shipments

All unit trains originating from western mines consist of open-top rail cars, but the size of cars varies not only between the two major railway companies but also within the same company.

The most common car size used by CP Rail is 48-ft long, 12-ft high and 10-ft wide. Cars from CN Railway are 50-ft long, 10-ft high and 10-ft wide.

Unit trains from Alberta to Vancouver cover a distance of approximately 700 miles at a maximum speed of 45 mph. Coal trains from British Columbia cover approximately the same distance but are allowed to travel at 50 mph.

9.2 Loading Profiles

The total surface profile of the coal cars comprized three distinct sections: a front slope, a central flat area and a rear slope. Typical longitudinal profiles showing slope lengths, slope angles, flat lengths and cross-sectional profiles are shown in Figure 4. The total exposed area, therefore, is comprised of the area along the two slopes plus the flat area.

9.3 Measurements of Surface Coverage

Initially, the areas of both front and rear slopes and the levelled area in the centre were measured in several cars from each of four mining companies. Later, a "trained observer" was exposed repeatedly to measured and observed sections of the cars in order to eliminate unnecessary measurements and costly slow-down procedures at the terminals. Measured and estimated percentages of the front slope, middle surface and rear slope were recorded on a pre-printed "Coal Car Coating Inspection" form (See Figure 5). From these individual area measurements, the extent of crustal cover remaining intact at the Vancouver terminal was calculated as a percentage of the total original coal surface. At the same time, a summary sheet was prepared. This summary included data on:

- Terminal
- Coal origin
- Train number
- Times train left origin and arrived at terminal
- Binder used
- Weather during treatment, during transit and during observation
- Number and location (in train) of cars inspected
- Nature of crust cracks, crust loss and crust character
- Abnormalities in profile
- Special observations
- Percent coverage
- Percent coverage on total coal surface.

In addition, colour photographs were taken of about 220 coal cars. See Plates 21 to 24 for typical photographic recordings.

10 PHASE II MONITORING RESULTS

10.1 Crust Retention Calculations

The number of cars and their respective coverage expressed in percent of total surface area have been tabulated for each mine in Tables 13, 14, 15 and 16. These data have been rearranged below to show the frequency distribution for total cover remaining as a percentage of coal cars inspected.

COVER REMAINING (%)	MINE B (%)	MINE C (%)	MINE A (%)	COVER REMAINING (%)	MINE D (%)
0-50	2.6	6.6	0	0-40	5.0
51-55	0.5	0.9	0	41-45	7.5
56-60	1.0	1.0	1.2	46-50	7.5
61-65	2.1	2.4	0	51-55	22.5
66-70	1.0	9.0	2.5	56-60	25.0
71-75	10.0	14.2	9.9	61-65	25.0
76-80	11.6	18.4	14.8	66-71	7.5
81-85	21.6	16.5	30.9		
86-90	26.3	17.0	21.0		
91-95	17.9	10.4	19.8		
95-100	5.3	3.3	0		

The frequency distribution of total cover remaining is shown graphically in Figure 6. The most frequently occurring coverage within a 5% interval is 86-90% for Mine B, 76-80% for Mine C, 81-85% for Mine A and 61-65% for Mine D.

10.2 Crust Retention on Front and Rear Surface Slopes

The percentage of cover remaining on front and rear slopes for coal shipped from Mines A, B, C and D and is tabulated in Table 17. This frequency distribution has been plotted for 10% intervals in Figures 7, 8, and 9. The most effective coverage observed resulted from levelling the front slope of the cars at the loading site of Mine B. Levelling increased surface crust retention by an average of 40% when compared to Mines A and C.

11 NEW LOADING TECHNIQUES AND CHEMICAL PRODUCTS FOR COAL DUST CONTROL

Since September 1976 all coal mines shipping to British Columbia terminals have adopted a modified method of loading and spraying unit trains.

New and more capable loading (eg. Plate 16) chutes have improved the loading profile, increased dust control and have reduced considerably the total loading time for the unit train. In addition, the operator can more effectively control the total tonnage carried by each car thus fewer variations in the total carrying capacity occur when cars are loaded to the allowable limit. The net result is a substantial saving of time and money.

Encouraged by the potential savings in coal losses and by required environmental controls, many companies in the U.S.A. and Canada are developing new chemical products to equal or better the performance of the products tested in this report.

Coverages approaching 100% can be expected by the end of the 1970's.

12 REFERENCES

1. Report 2382 - Coal Dust Study - Roberts Bank, B.C. Research, Vancouver, B.C.

2. V.K. Beshketo, "How to Reduce the Loss of Coal when Transported at High Speeds", Zheleznodorozhni Transport, p. 27, October 1964.

3. G.H. Denton et al, "Minimization of In-transit Windage Losses of Olga Low Volatile Coal", 1972 Coal Show, American Mining Congress, Cleveland, Ohio.

4. M.M. Papic and A.D. McIntyre, "Surface Active Agents in Coal Dust Abatement", p. 85, Coal Age, June 1973.

5. P.L. Schwartz, "Innovations in Railroad Transportation of Mineral Products", Paper presented at the Second International Symposium on Transport and Handling of Minerals, Rotterdam, Netherlands, October 1-6, 1973.

TABLE 1

MOVEMENT OF COAL TO BRITISH COLUMBIA TERMINALS DURING 1973

SHIPPER*	FROM	TO	COAL TRANSPORTED (Short Tons)
CPR	Elkview	Delta	4,847,530
CPR	Fording	Delta	2,464,740
CPR	Coleman	Port Moody	867,497
CPR	Canmore	Port Moody	200,249
CNR	Winniandy	Vancouver	1,658,251
CNR	Luscar	Vancouver	1,265,272

* CPR - Canadian Pacific Railway
  CNR - Canadian National Railway

TABLE 2

VISUAL OBSERVATION FORM - PHASE I

Participant _____ Spraying date _____

Product tested _____ Spraying location _____

Test No. _____ Type of coal _____

Train No. _____ Test rated by _____

Car No. / Parameter		Weather	General Crust Appearance	Crust	Binder Penetration (inches)		Condition of Fines		Remarks
					Top	Sides	Crust	Cracks	
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								
_____	origin								
conc.____	en route								
vol.____	terminal								

LEGEND:

(H) homogeneous (F) friable
(C) crushed (B) brittle
(P) patchy (T) tough
(N) nodulized

(U) unconsolidated
(C) consolidated

TABLE 3

Imp Oil Ltd

TEST RESULTS AND SUMMARY: COAL SPRAY 100

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Kaiser	20	100	Good coverage up to 30 gal/car.
	30	100	
	45	100	Excellent coverage above 45
	60	100	
	70	100	gal/car.
Foraing	40	100	Very homogeneous coverage. Some
	50	100	
	60	100	evidence of blowing. Good
	70	100	
	80	100	results.

TABLE 4 Continued

TEST RESULTS AND SUMMARY: RECLAMATION OIL

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	25	100	Good coverage on slopes.
Fording	50	100	Very good. Minor exposure of ends.
Fording	30	100	Soft crust. Good ends.
Fording	30	100	Good coverage. Minor exposure of ends.

TABLE 5

TEST RESULTS AND SUMMARY: DUST SUPPRESSANT 100

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	70	30	Good crust. Fair results.
Ft. Steele	75	15	Tough crust. Poor spraying. Good results.
Ft. Steele	45	25	Good crust. Good results.
Ft. Steele	70	10	Brittle to tough crust. Evidence of blowing.
Kaiser	50	5	Homogeneous, brittle to tough. Good coverage.
Kaiser	120	15	Fair to good. Evidence of blowing.
Kaiser	50	25	Good crust. Excellent results.
Fording	50	15	Homogeneous crust. Ends blown. Poor to fair results.
Fording	50	15	Homogeneous crust. Ends blown. Poor to fair results.
Fording	108	10	Homogeneous, poor slopes.
Fording	62	15	Consolidated crust. Slopes partly exposed.

TABLE 6 Dust Sup 200

TEST RESULTS AND SUMMARY: DUST SUPPRESSANT 200

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	90	15	Homogeneous crust. Exposed ends.
Fording	60	15	Soft crust. Minor exposure of ends.
Fording	50	15	Good coverage on improved profiles.

TABLE 7

TEST RESULTS AND SUMMARY: DOWELL M167

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	24	9.0	Friable to brittle crust. Fair.
Ft. Steele	60	10.0	End erosion by wind. Fair.
Ft. Steele	25	5.0	Friable crust. Poor penetration.
Ft. Steele	42	5.0	Thicker crust. Fair to good.
Ft. Steele	43	5.0	Patchy. Wind erosion. Poor.
Kaiser	65	7.5	Good coverage. Fair to good results.
Kaiser	40	7.5	Good appearance. Good results.
Kaiser	40	10.0	Brittle to tough crust. Fair.
Fording	40	7.5	Rain had detrimental effect. Poor.
Fording	55	7.5	Brittle crust. Fair results.
Fording	60	5.0	Friable crust. Wind erosion. Poor.

TABLE 8

TEST RESULTS AND SUMMARY: LIGNIN DERIVATIVES

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Fording	50	8	Crust thickness up to 3".
Fording	60	8	Evidence of blowing at both
Fording	70	8	ends. Fair results.
Fording	80	8	
Fording	72	8	Brittle crust. Poor ends.
Fording	80	8	Fair coverage on slopes.
Fording	60	8	Excessive exposure on poor profile.

TABLE 9

TEST RESULTS AND SUMMARY: AQUATAIN

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	32	12.5	Weak, friable crust. Slopes exposed.
Ft. Steele	45	14.2	Friable crust. Wind erosion. Poor.
Ft. Steele	18	20.0	Patchy, friable crust. Poor.
Ft. Steele	40	14.3	Patchy crust. Ends eroded.
Ft. Steele	40	33.0	Evidence of blowing. Poor.
Kaiser	32	Not reported	Thin, friable. Poor results.
Kaiser	36		Improved crust. Poor to fair.
Kaiser	23		Friable crust. Poor to fair.
Fording	73	6.6	Homogeneous thin crust. Fair.
Fording	60	6.6	Sides blown. Poor results.
Fording	60	6.6	Thin and friable crust. Ends eroded.

TABLE 10

TEST RESULTS AND SUMMARY: ALCHEM 63026

SPRAYING LOCATION (Mine Site)	VOLUME (Gal.)	CONCENTRATION (%)	REMARKS
Ft. Steele	27	7.2	Friable, inadequate coverage. Poor.
Ft. Steele	27	5.4	Thin crust, excessive wind erosion. Poor.
Ft. Steele	26	3.8	Extremely poor. Little or no crust.
Ft. Steele	27	3.0	Much evidence of blowing. Poor.
Ft. Steele	30	1.6	Poor results on poor profiles.
Kaiser	27	3.8	Thin, friable crust. Much blowing.
Kaiser	27	11.0	Improved crust. Still unacceptable.
Fording	30	4.0	Patchy, friable crust. Poor.
Fording	40	10.0	Slight improvement. Still very patchy.
Fording	26	6.2	Thin and friable. Poor.

TABLE 11

RATING AND ACCEPTABILITY OF CHEMICAL BINDERS
BASED ON COMPARISON TESTS OF BEST PERFORMANCES

(Derived from Tables 3 to 10)

BINDER	VOLUME (Gal.)	CONCENTRATION (%)	GALS/CAR	RATING	ACCEPTABILITY
Coal Spray 100	45	100.0	45.0	1	Best performance on
Reclamation Oil	50	100.0	50.0	2	all profiles.
DS 100	50	25.0	12.5	3	Effective on flat pro-
DS 200	50	15.0	7.5	4	files and slopes.
Dowell M167	65	7.5	4.9	5	Effective on flat
Lignin Derivative	60	8.0	4.8	6	profiles.
Acquatain	73	6.6	4.8	7	Unacceptable.
Alchem 63026	40	10.0	4.0	8	

TABLE 12

NUMBER OF TRAINS AND CARS MONITORED DURING PHASE II FIELD WORK

SOURCE	NO. OF TRAINS	TOTAL CARS	CARS/TRAIN (Average)	LOCATION IN TRAIN
Kaiser	12	211	17.6	Front 3 trains Centre 4 Rear 4 All cars 1
Fording	10	215	21.5	Front 6 trains Centre 1 Rear 2 All cars 1
Luscar	4	79	19.7	Front 1 train Centre 1 Rear 2
McIntyre	4	42	20.0 (2 trains) 1.0 (2 trains)	

TABLE 13

MINE B

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	432	434	436	444**	446**	448**	450	457	460	463	468	TOTAL
DATE	Aug 31	SEP 3	4	7	9	10	11	15	17	18	19	
NO CARS	10	18	20	20	13	28	20	20	20	20	2	211
LOCATION	R	C	C	C	R	All	F	C	F	F	R	
WEATHER	CI	OW	SW	SW	SW	SW	SW	R	SW	SW	SW	
COAL							WET	WET	WET			
PERCENT												
98		5[a]										5
97												
96		5										5
95		5							4			9
94										2		2
93								2	3	1		6
92		1						1		4		6
91		1		1					1	8		11
90			1	3		3	2		5	1		15
89			1	2				1	1			5
88			5	1	1		1	1	1	2		12
87						2		4				6
86			3	2	1		2	2	1	1		12
85			2	4		1	2	3	1		2	15
84			3	1	1		1					6
83					1	2		1				4
82			1		1	3	2	1				8
81			1		2	1	2	2				8
80				1		2			2	1		7
79					2							2
78					1	1	1					3
77						1	2					3
76	1			1	2		3					7
75				1		4	1		1			7
74	1					4	1					
73												
72			2			2						4
71	1					1						2
70					1							1
69												
68				1								1
	(63) 1	(50) 1	(65) 1	(65) 1		(63) 1	(63) 1					
	(59) 1						(60) 1					
	(54) 1											
	(39) 1											
	(38) 1											
	(36) 1											
	(23) 1											

**Binder is "modified" latex.

Footnote: a. The number of cars with percentage cover as shown.

TABLE 14

MINE C

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	821249	821254	821257	821261	821262	821263	821269	821270	821271	821273	Total
DATE	Aug 29	Sept 1	Sept 5	Sept 8	Sept 9	Sept 9	Sep 16	Sep 16	Sep 17	Sep 19	
NO. CARS	44	24	22	20		22	22	24	25	12	
LOCATION	All	F	F	F*	F	F*	F*	R	R	C	
WEATHER	SW	OW	SW	SW	SW	SW	OW	OW	SW	SW	
COAL PERCENT											
97	1										1
96	1		2						2		5
95									1		1
94	6								1		7
93	4								2		6
92	1								2		3
91	3							1	1		5
90	1		1					1	1		4
89	3		1	1					1		6
88	3						1	1	4		9
87	2					2		2	3		9
86	1			1		1		2	2	1	8
85	1		1	1		3	1	1		1	9
84	2						1	2			5
83	1	1	2				1	2	1	1	9
82			1			2		1			4
81			1	2		2	1	1	1		8
80				2		3		1			6
79	2	1	2	1				2		1	9
78	3	2	1	1		2	1			1	11
77	1		1	2			1				5
76	2	1				2				3	8
75						1	2		1	2	6
74	2			1			1	1		1	6
73	2		2	2		1	1				8
72		1		1		1	1	1			5
71			1			1	1	1		1	5
70			1			1	1				3
69		1	1	1			1				4
68		2	1				4				7
67		3					1				4

PART INSPECTED WAS NOT COATED

*Night train

SW = Sunny and warm; OW = Overcast and warm; Cl = Cloudy
R = Rain. F = Front; R = Rear; C = Centre.

TABLE 14 (CONTINUED)

MINE C

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	821249	821254	821257	821261	821262	821263	821269	821270	821271	821273	Total
DATE	Aug 29	Sept 1	Sept 5	Sept 8	Sept 9	Sept 9	Sep 16	Sep 16	Sep 17	Sep 19	
NO. CARS	44	24	22	20		22	22	24	25	12	
LOCATION	All	F	F	F*	F	F*	F*	R	R	C	
WEATHER	SW	OW	SW	SW	SW	SW	OW	OW	SW	SW	
COAL											
				(66) 1			(65) 1	(65) 1			
							(64) 1				
								(63) 1			
				(62) 1							
		(60) 1	(60) 1								
	(59) 1										
		(57) 1									
		(55) 1									
		(53) 1									
								(48) 1			
		(43) 1									
		(39) 1									
									(38) 1		
			(36) 1	(36) 1							
				(35) 1							
		(29) 1									
		(23) 1									
								(21) 1			
		(20) 1	(20) 1								
		(0) 2									

*Night Train.

TABLE 15

MINE A

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	L151*	L154	L158	L160	TOTAL
DATE	Aug 28	Sept 3	Sep 14	Sep 16	
NO. CARS	19	20	20	20	
LOCATION		C	R	R	
WEATHER	R	SW	SW	SW	
COAL PERCENT					
94				1	1
93	1	1	1	3	6
92				4	4
91			1	3	4
90		1		3	4
89	1			4	5
88					
87	1	1			2
86	2	1	3		6
85	2			1	3
84		4	3	1	8
83		3			3
82	3	1	5		9
81	1	1			2
80			1		1
79	1				1
78	1	2	2		5
77	1		1		2
76		1	2		3
75	1	2			3
74					
73		1			1
72	3	1			4
71					
70					
69					
			1		1

*Night train.

TABLE 16

MINE D

COVER REMAINING ON COAL ON ARRIVAL AT TERMINAL (PERCENT OF TOTAL SURFACE)

TRAIN	M380	M381*	M388	M389	TOTAL
DATE	Sep 9	Sep 10	Sep 22	Sep 23	
NO. CARS	18	22	1	1	
LOCATION	F	F-W			
WEATHER	SW	SW			
COAL					
PERCENT					
71	1				1
70		1			1
69		1			1
68					
67					
66					
65					
64	1	1			2
63	3	1			4
62	1				1
61	1	1			2
60				1	1
59	1	2			3
58		2			2
57	2	1			3
56	2				2
55		1			1
54	1				1
53	2	1			3
52	1	1			2
51		2			2
50		1			1
49	1		1		2
48					
47	1				1
46					
45		1			1
44					
43		1			1
42		1			1
30		1			1
0					1

*Night train

TABLE 17

FREQUENCY OF COVERAGE ON

FRONT AND REAR SLOPES

Percent Cover	Kaiser		Luscar		Fording	
	Front	Rear	Front	Rear	Front	Rear
0	1	16	1	13	9	10
5	-	2	-	-	1	-
10	2	14	1	4	19	3
15	-	-	-	1	1	-
20	2	10	1	5	13	6
25	-	5	3	-	3	-
30	-	9	10	4	15	14
35	1	6	1	1	2	-
40	-	18	6	10	23	23
45	-	1	1	1	-	1
50	8	14	16	21	20	32
55	-	1	2	-	-	2
60	5	14	14	14	34	31
65	-	1	2	3	-	3
70	4	11	12	1	27	11
75	1	7	3	2	5	10
80	13	18	4	2	16	18
85	9	9	-	-	2	10
90	42	15	1	1	10	13
95	14	9	-	-	6	15
95+	6	3	-	-	-	9
100	22	8	-	-	-	2

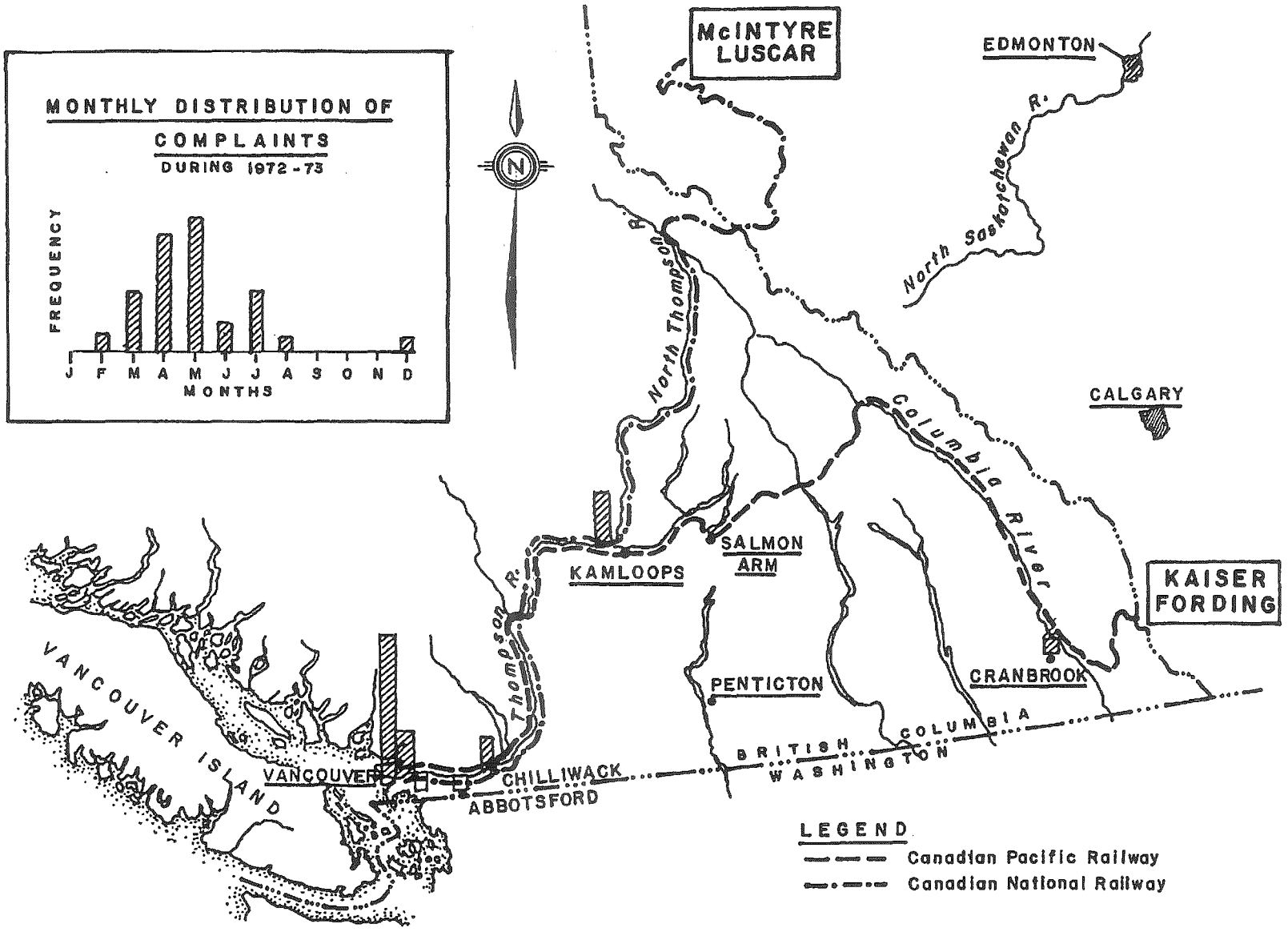


FIGURE 1 REGIONAL DISTRIBUTION OF COMPLAINTS DURING 1972 - 1973

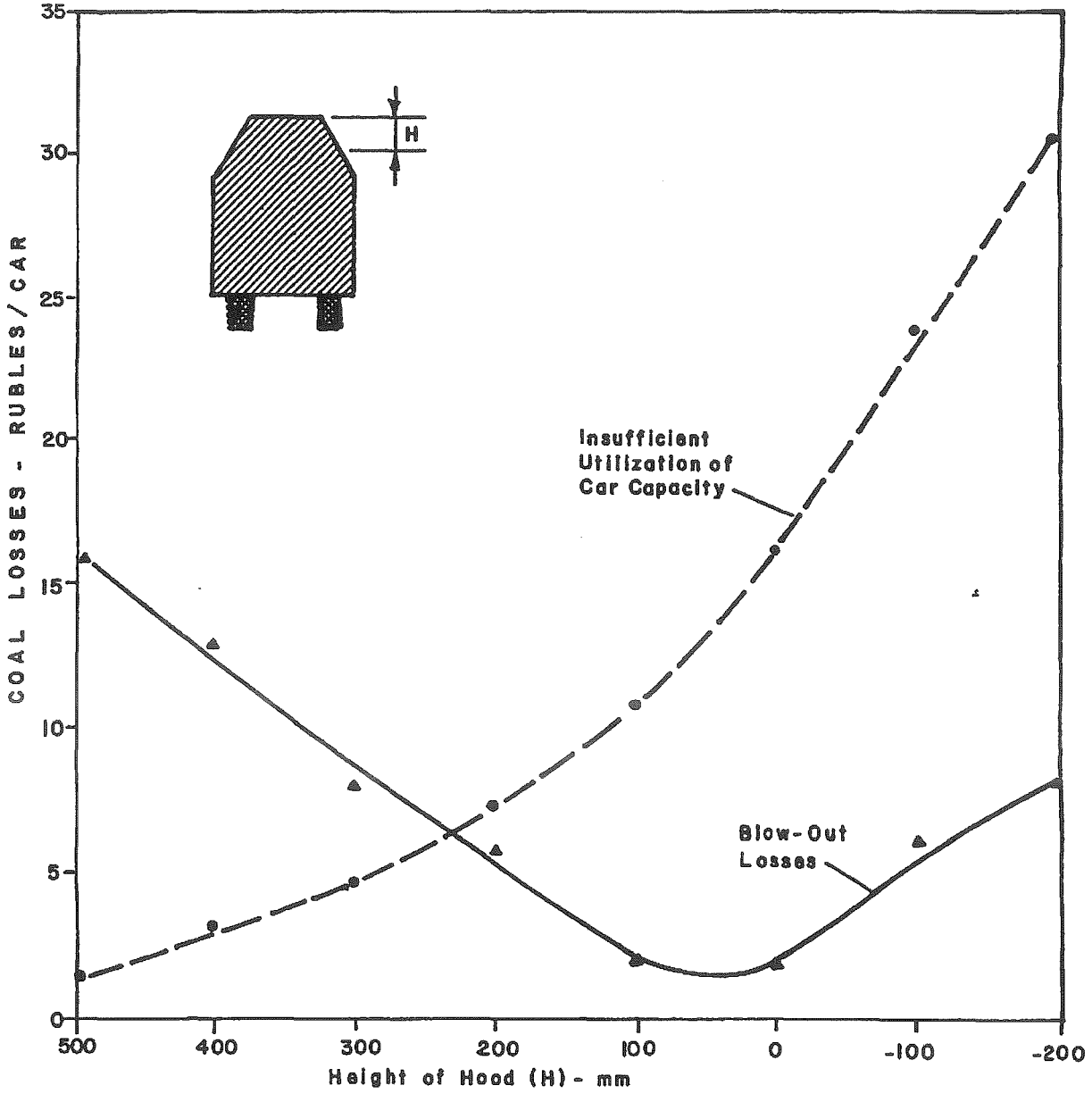


FIGURE 2 COAL LOSSES OF HIGH SPEEDS
(After V.K. Beshketo)

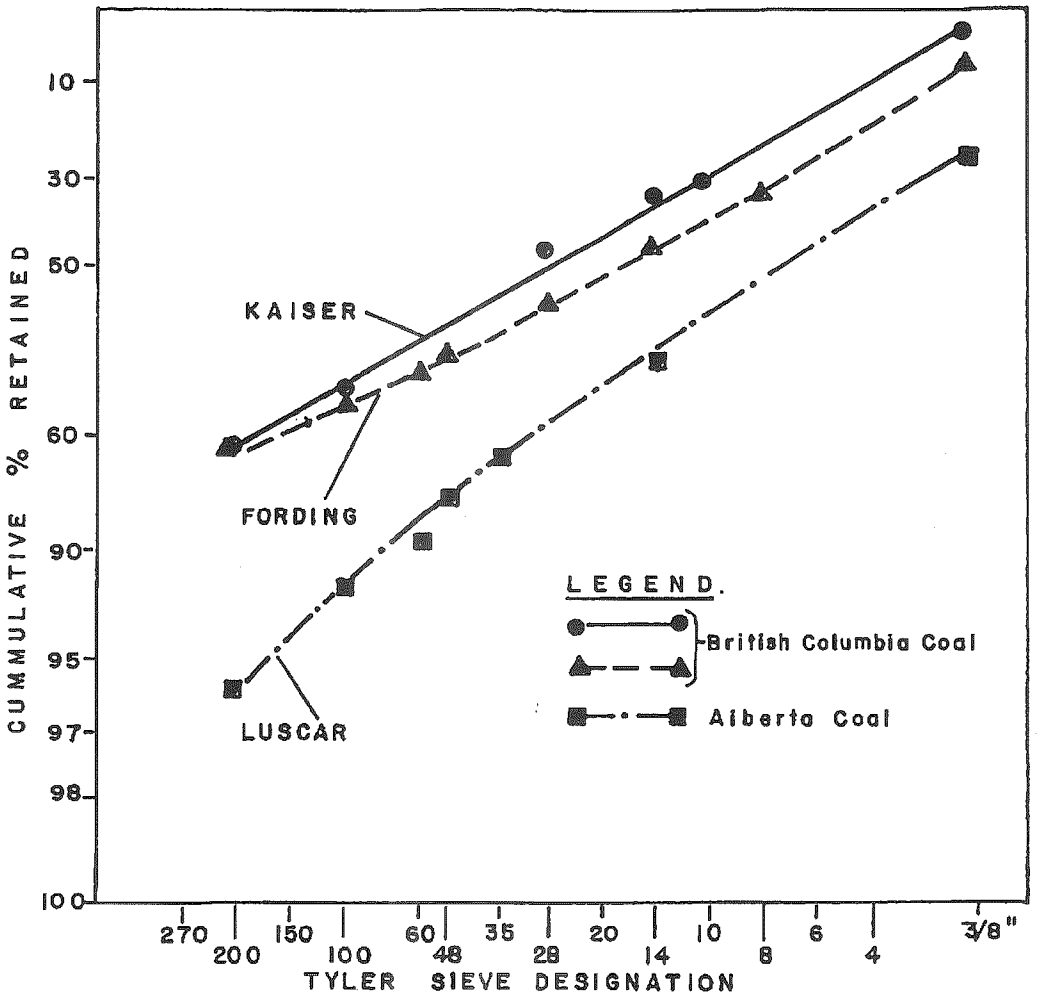


FIGURE 3 COMPARATIVE SCREEN ANALYSIS OF BRITISH COLUMBIA AND ALBERTA COALS

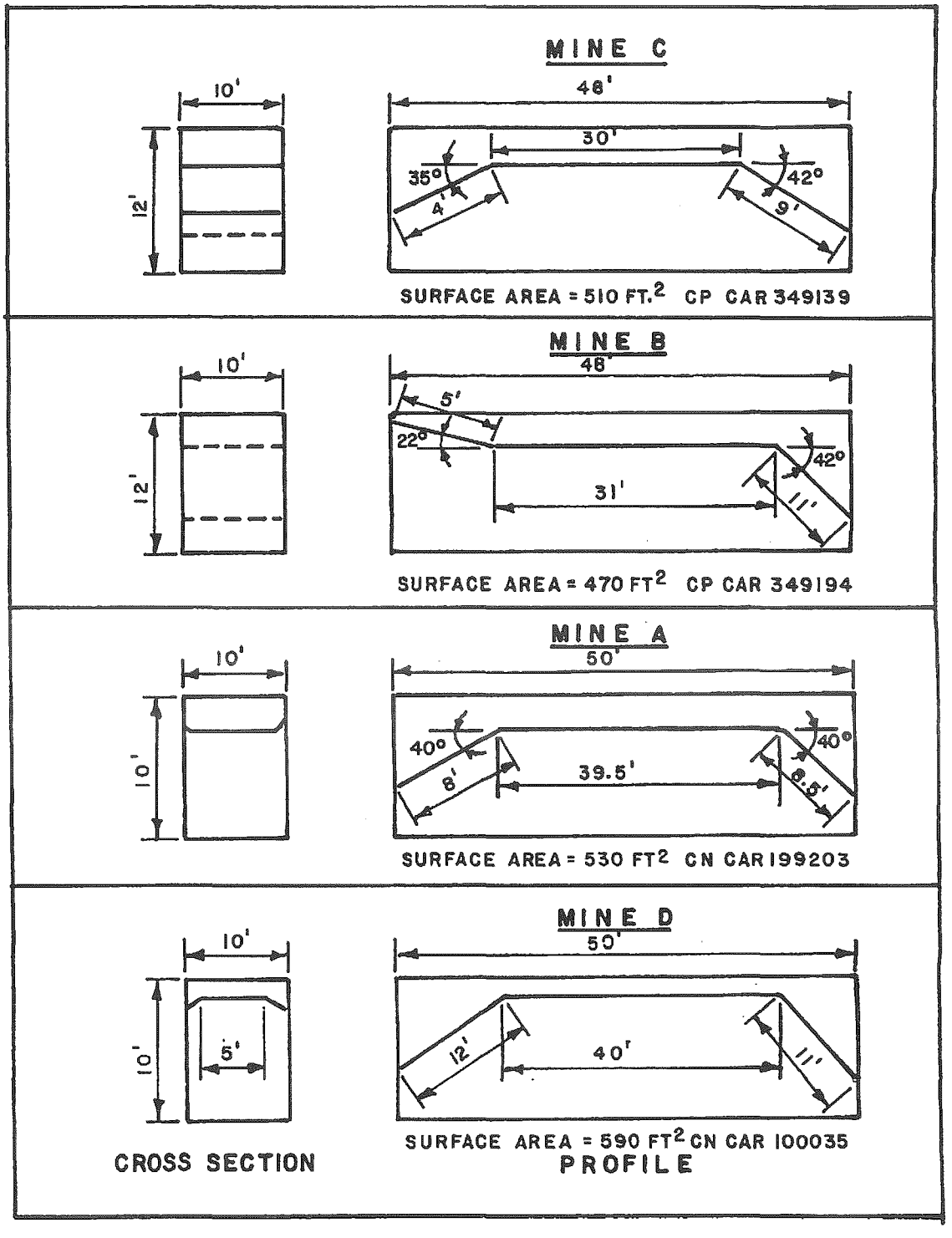


FIGURE 4 TYPICAL COAL CAR SURFACE DIMENSIONS -
(From Levelton & Associates Ltd.)

B. H. LEVELTON & ASSOCIATES LTD. 1755 WEST 4TH., VANCOUVER, B.C. V6J 1M2 PHONE 736-6516

COAL CAR COATING INSPECTION

Terminal _____ Date Treated _____ Origin _____

Photo No. _____ CP/CN Train No. _____

Inspector _____ Date Examined _____ Car No. _____

Time _____ Binder _____

Weather - During Treatment _____ During Trip _____ On Arrival _____

	FRONT	FLAT	REAR	TOTAL
% Coverage				
Condition				
Dust Escapement Evidence				
Crust Flexibility				
Crust Thickness				
Crust Failure Nature and Prevalence				
Incomplete Coverage				

Terminal _____ Date Treated _____ Origin _____

Photo No. _____ CP/CN Train No. _____

Inspector _____ Date Examined _____ Car No. _____

Time _____ Binder _____

Weather - During Treatment _____ During Trip _____ On Arrival _____

	FRONT	FLAT	REAR	TOTAL
% Coverage				
Condition				
Dust Escapement Evidence				
Crust Flexibility				
Crust Thickness				
Crust Failure Nature and Prevalence				
Incomplete Coverage				

FIGURE 5

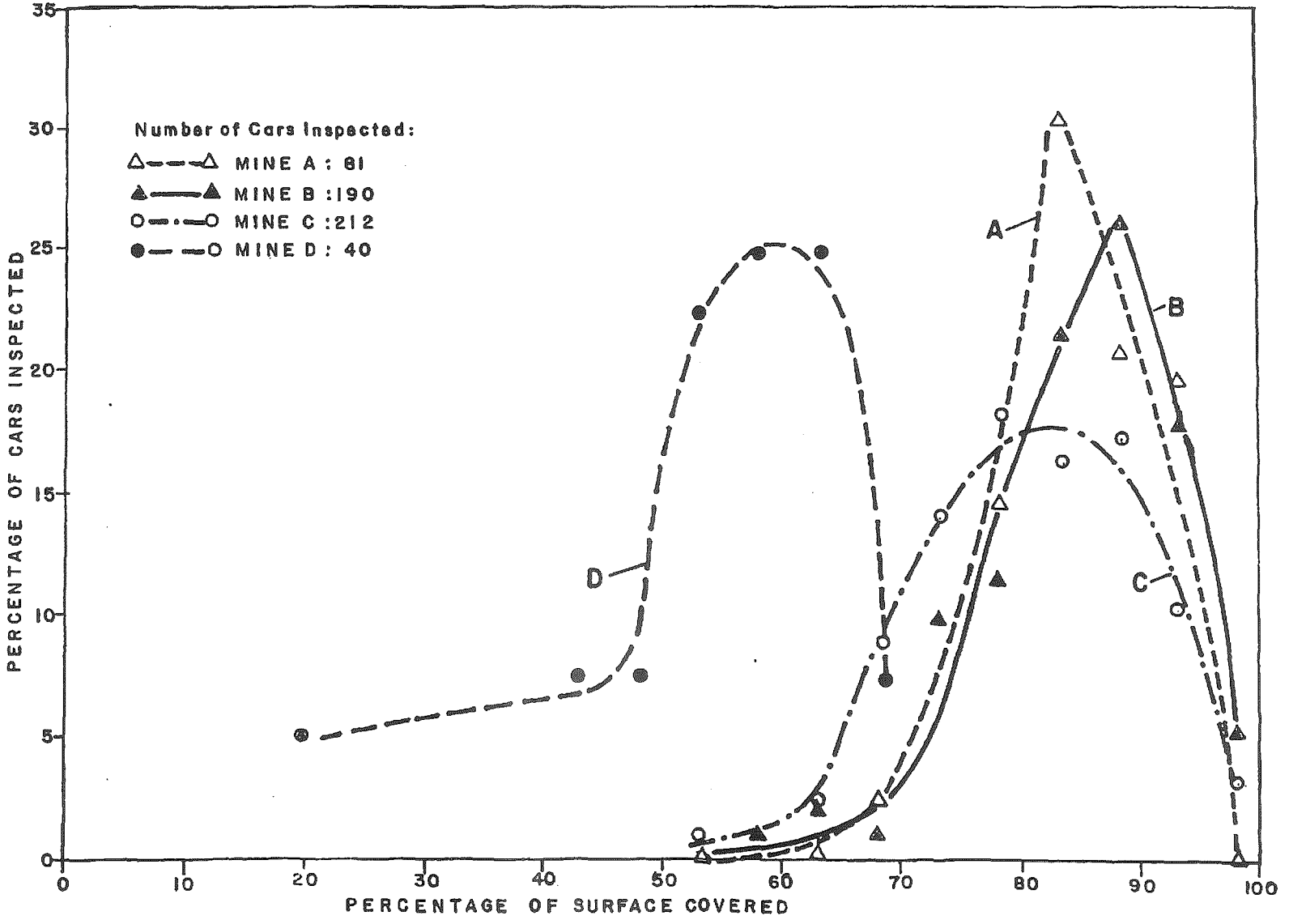


FIGURE 6 DISTRIBUTION OF COVER REMAINING ON TOTAL SURFACE OF COAL CARS

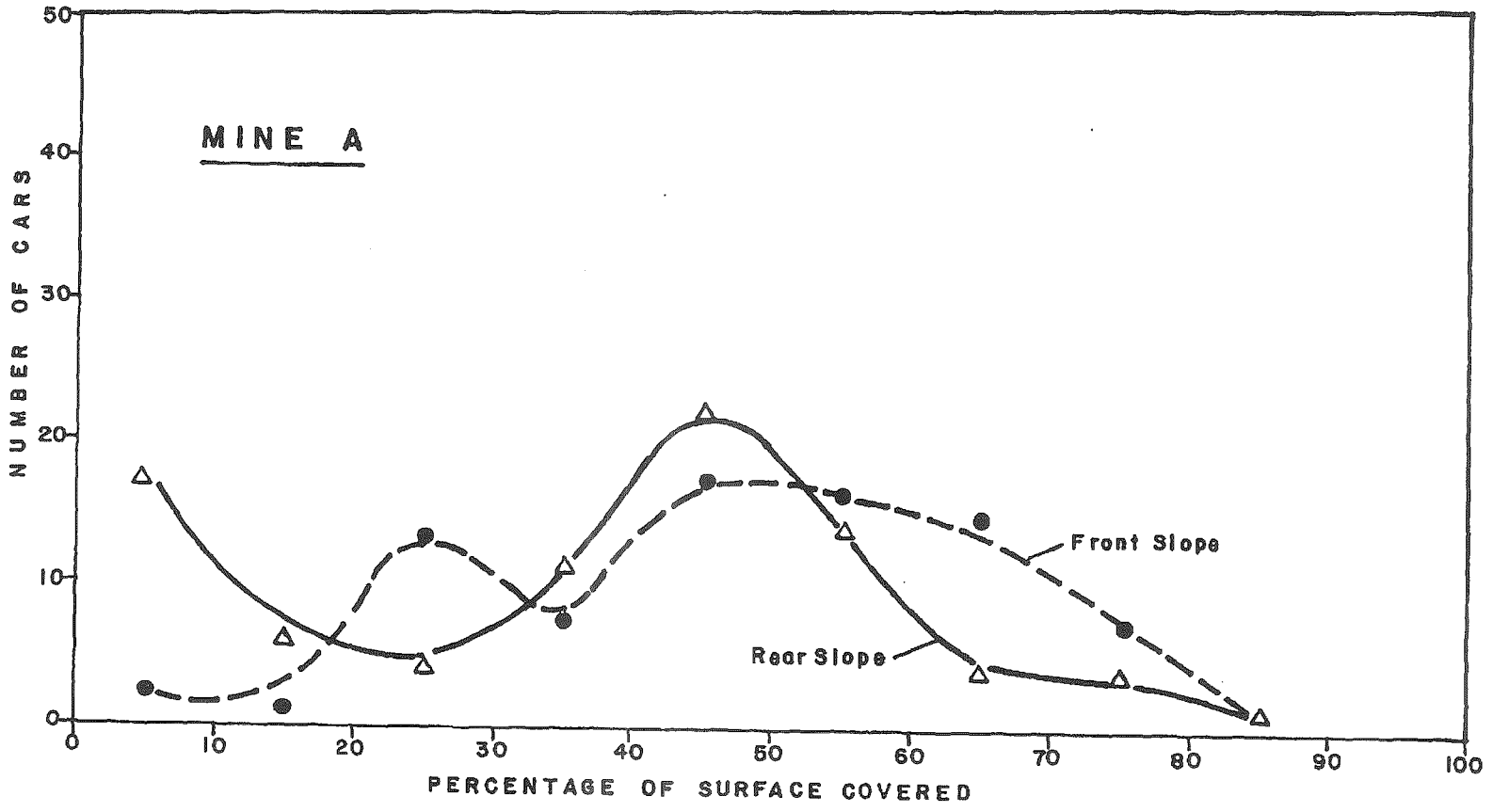


FIGURE 7 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

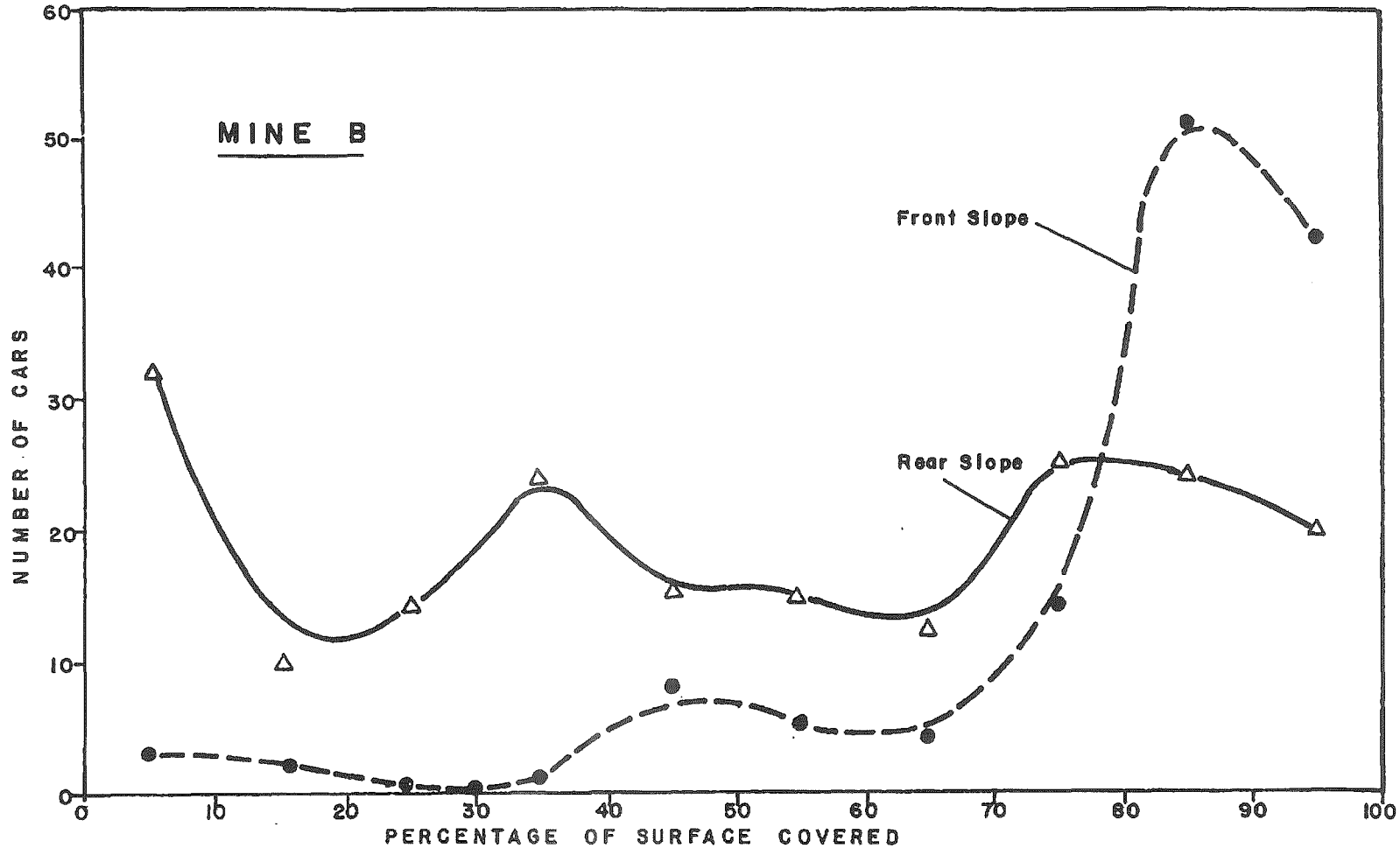


FIGURE 8 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

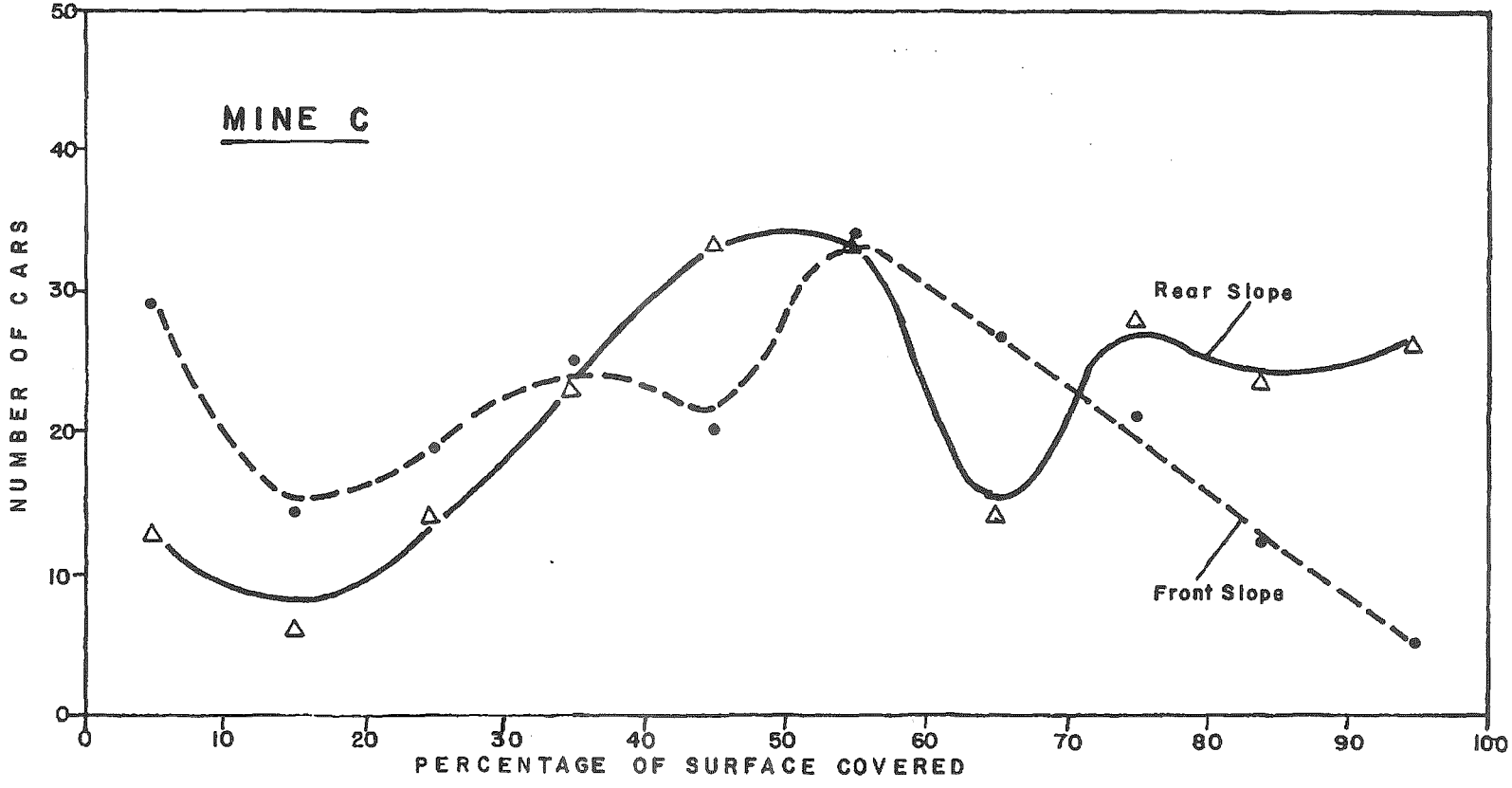


FIGURE 9 DISTRIBUTION OF COVER REMAINING ON FRONT AND REAR SLOPES

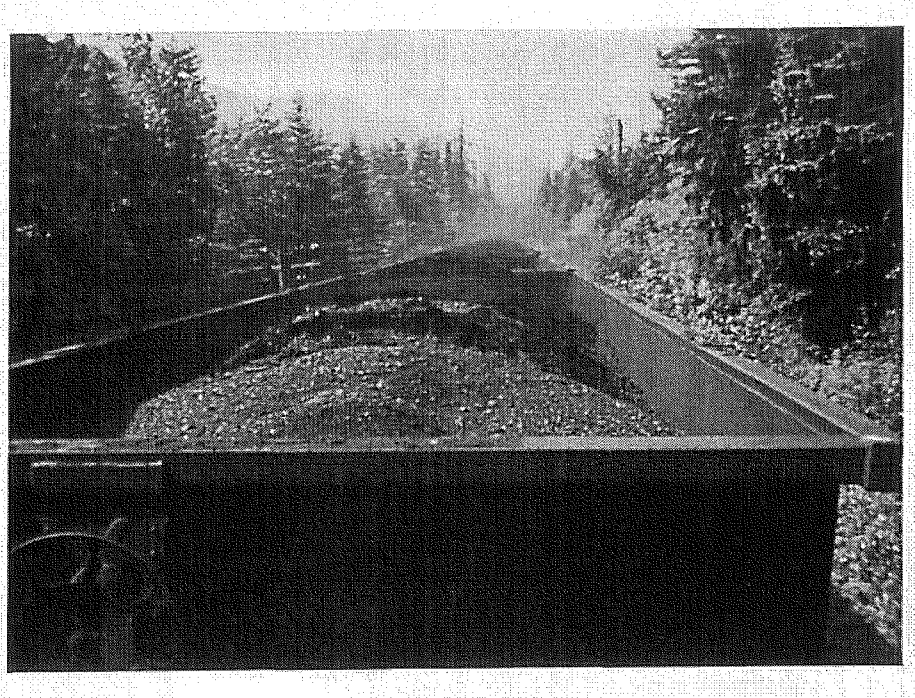


PLATE NO. 1: COAL LOSSES IN TRANSIT

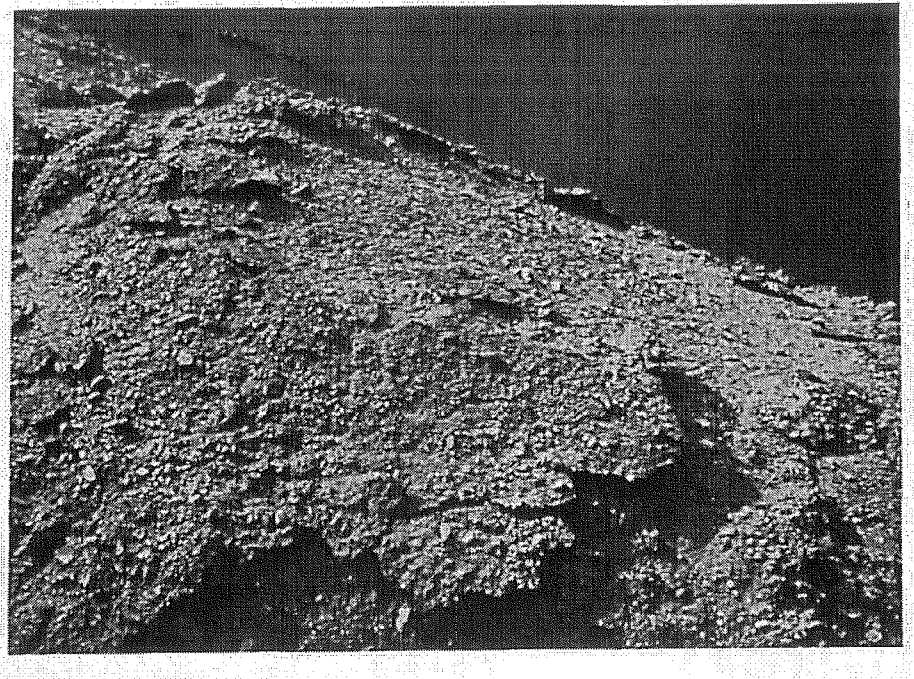


PLATE NO. 2: INCOMPLETE COVERAGE OF SLOPES

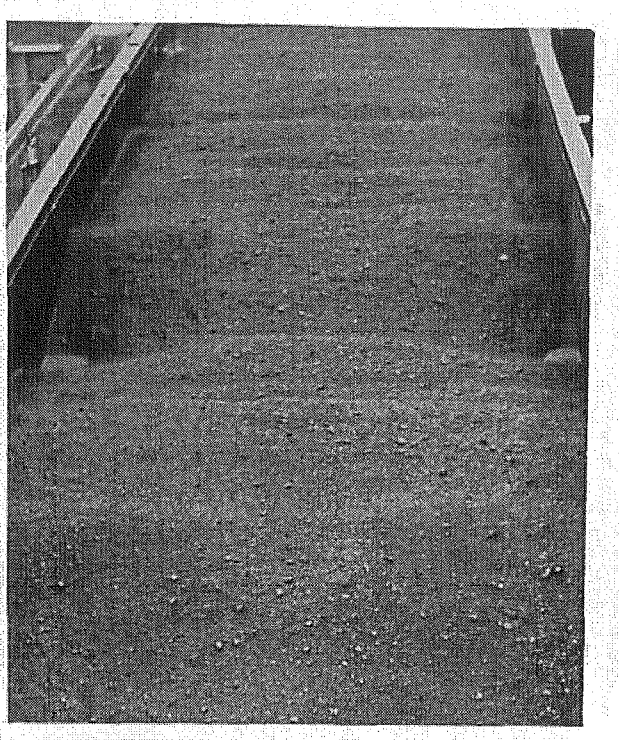
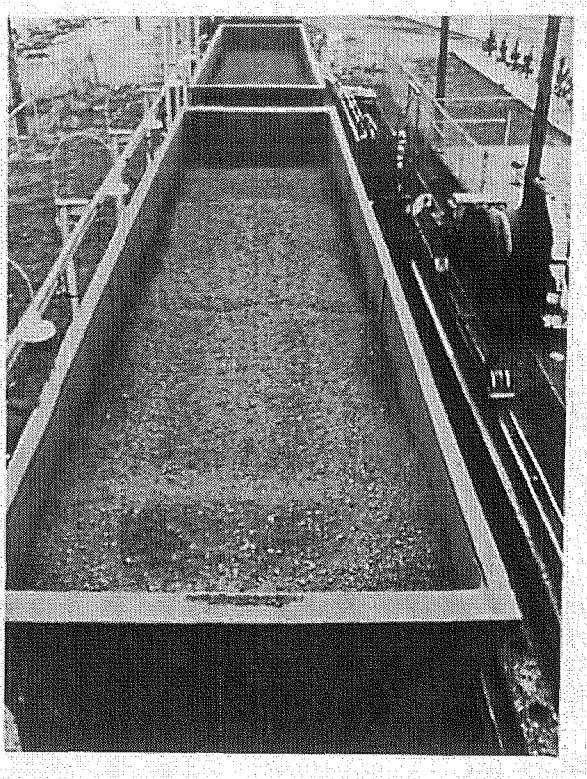


PLATE NO.3: UNTREATED CAR SHOWING POOLS OF WATER AND COARSE COAL

PLATE NO.4: PREFERENTIAL WIND EROSION OF UNTREATED CAR



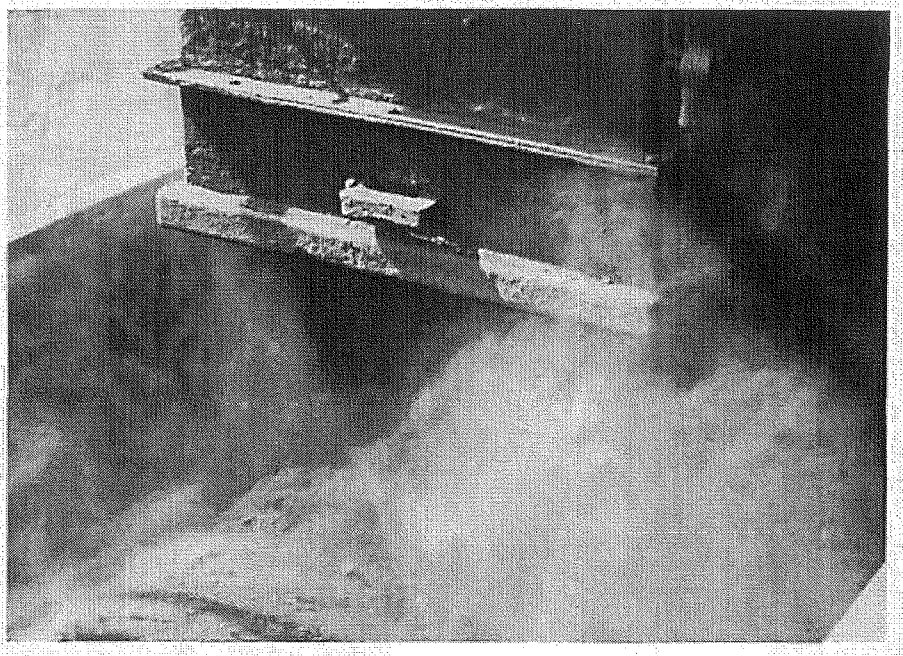


PLATE NO.5: ORIGINAL LOADING METHOD

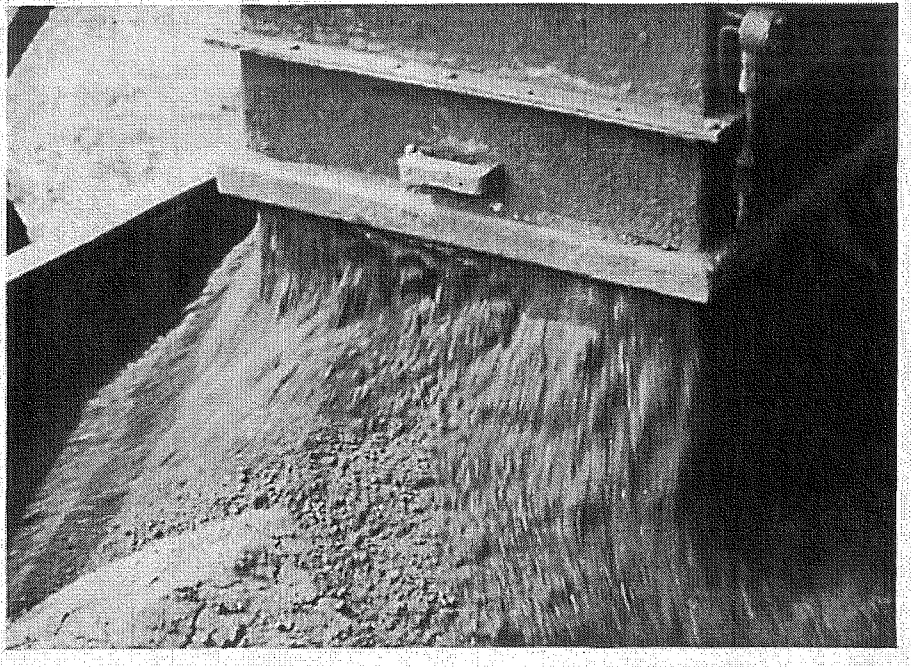


PLATE NO.6: FORMATION OF UNDESIRABLE SLOPES

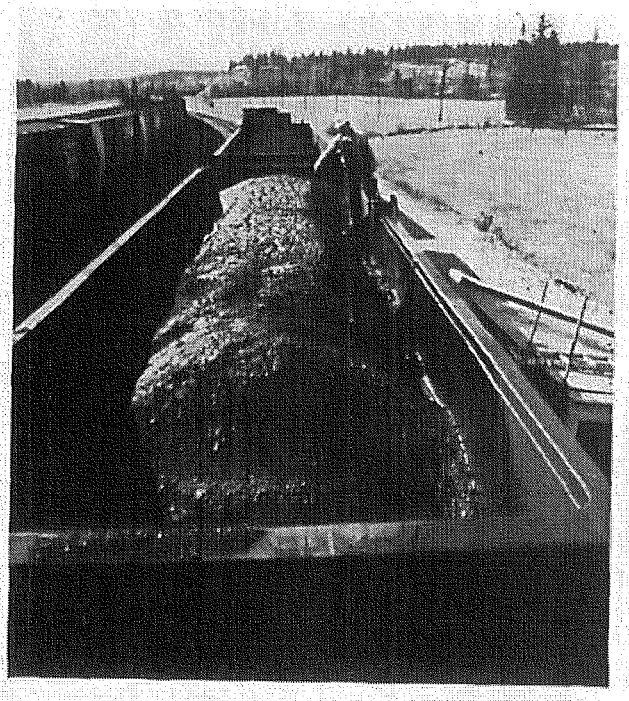


PLATE NO.7: HAND APPLICATION OF ASPHALT EMULSION

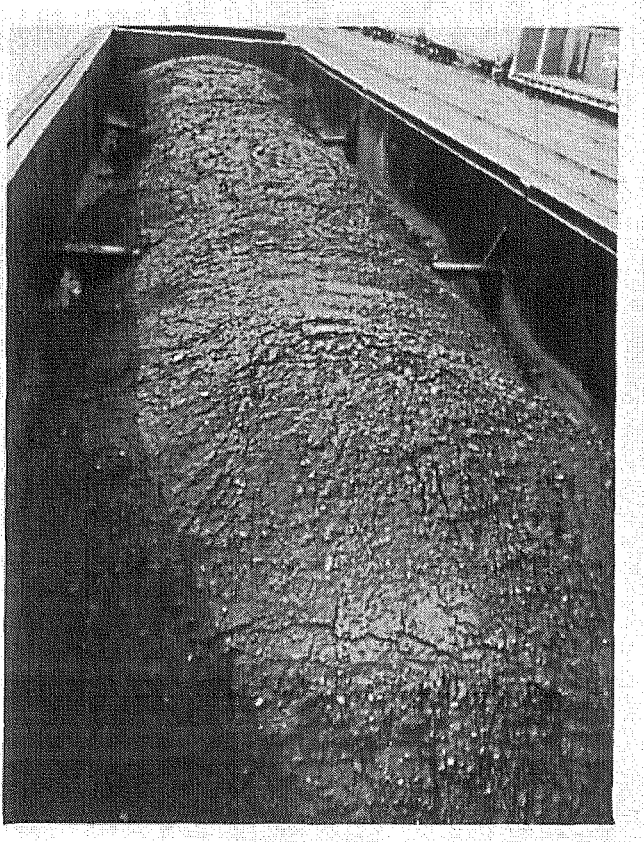


PLATE NO.8: CAR IN PLATE 7 AT KAMLOOPS

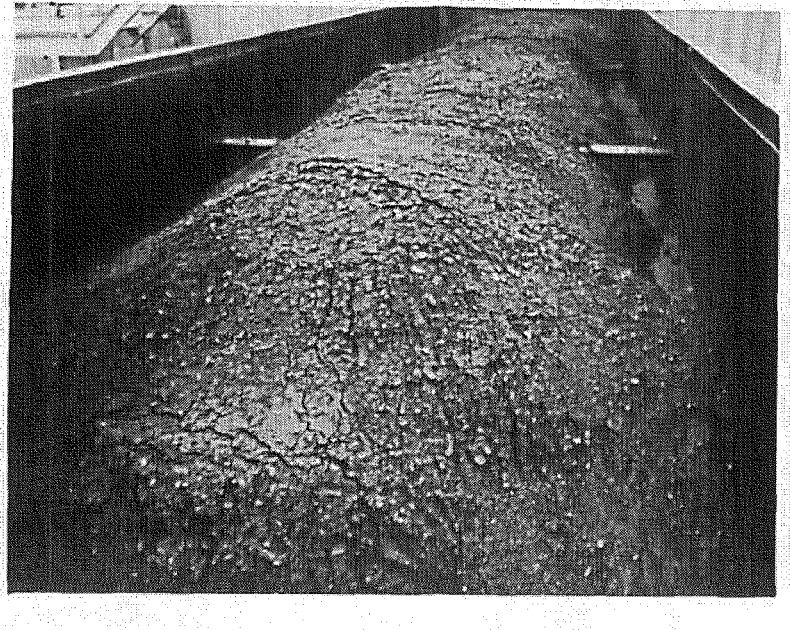


PLATE NO.9: CAR IN PLATE 7 AT WESTSHORE TERMINALS

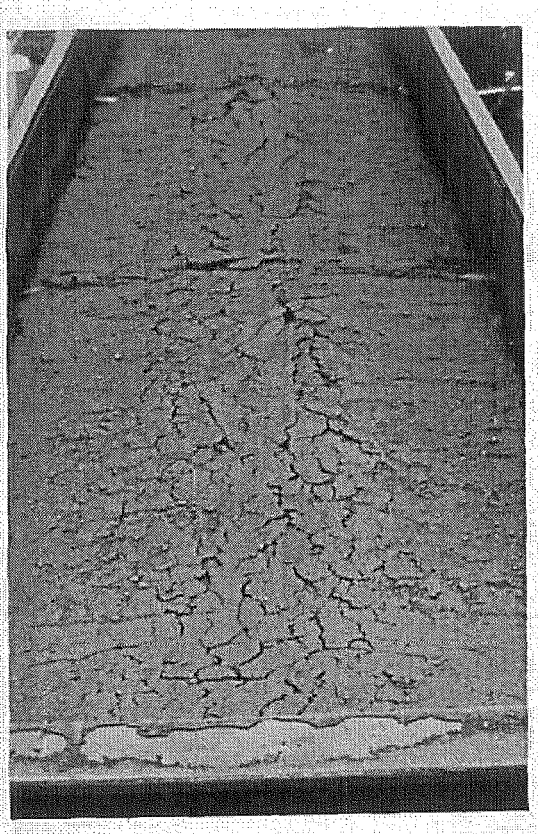


PLATE NO.10: UNIFORM SURFACE COVER

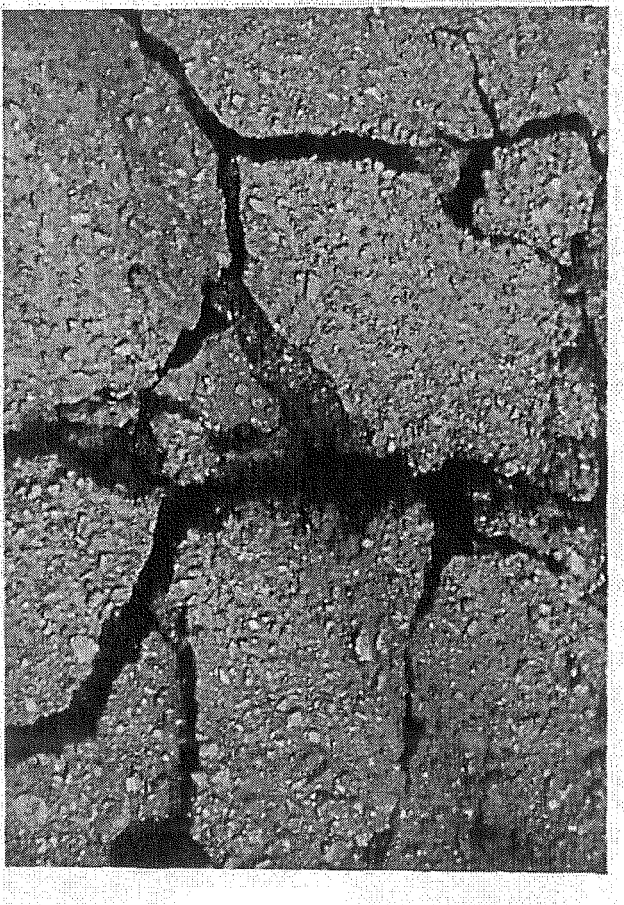


PLATE NO.11: CLOSE-UP SHOWING PENETRATION OF BINDER

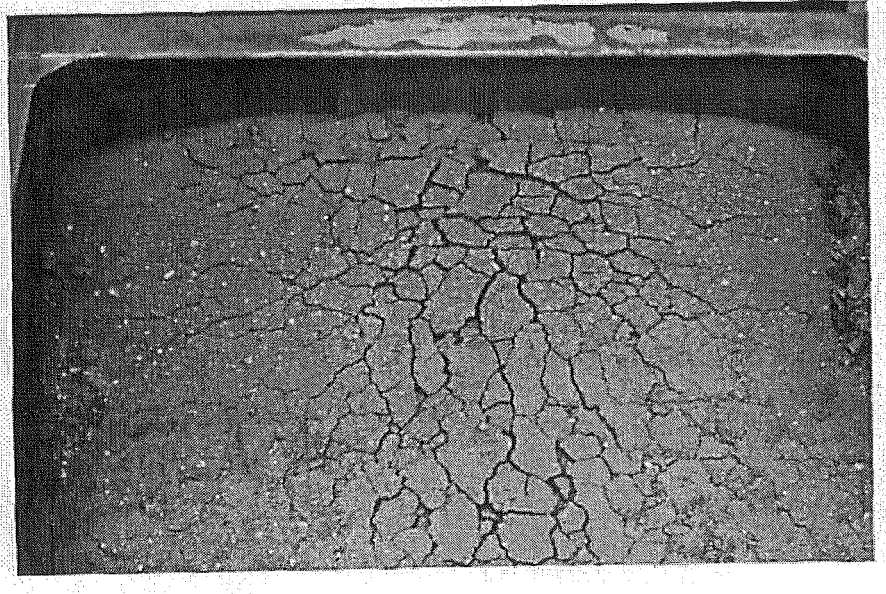


PLATE NO.12: WELL PROTECTED FRONT-END SURFACE

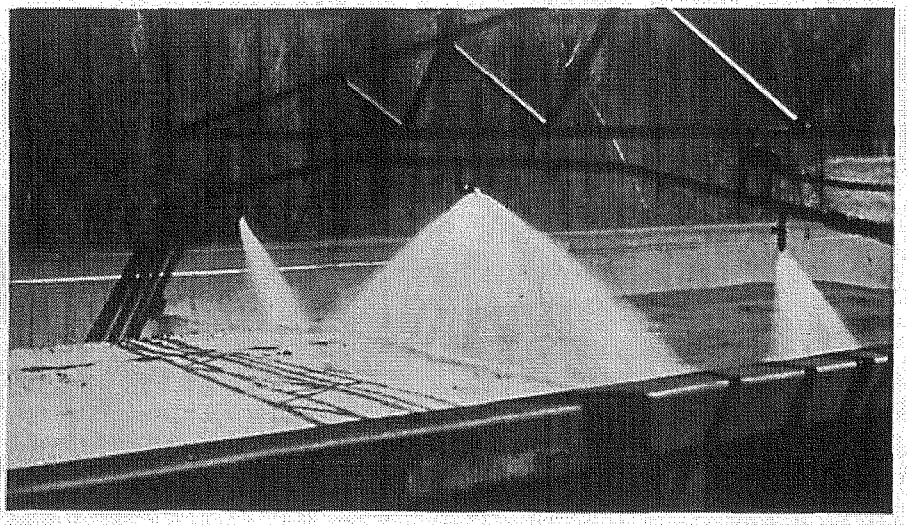
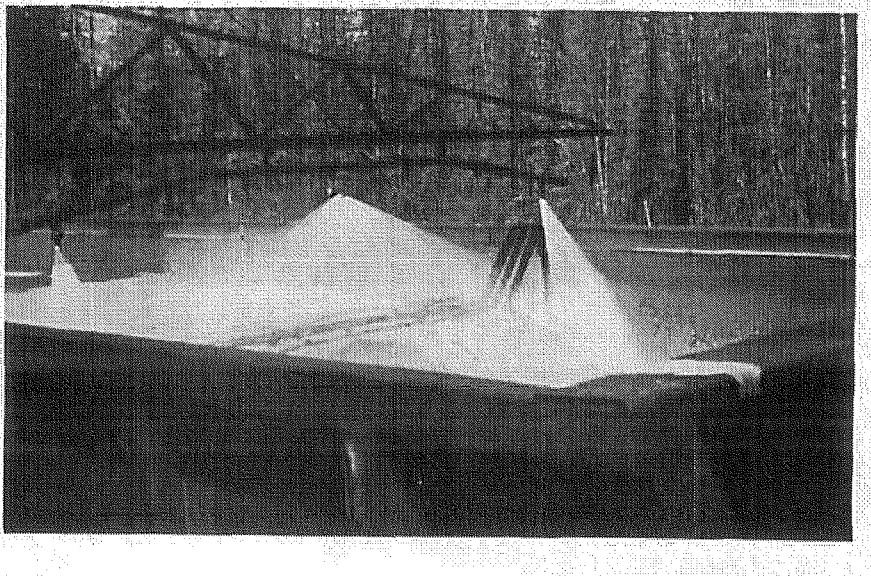


PLATE NO.13: PREFERENTIAL SPRAYING PATTERN OF A WELL PREPARED SURFACE

PLATE NO.14: END SPRAYING



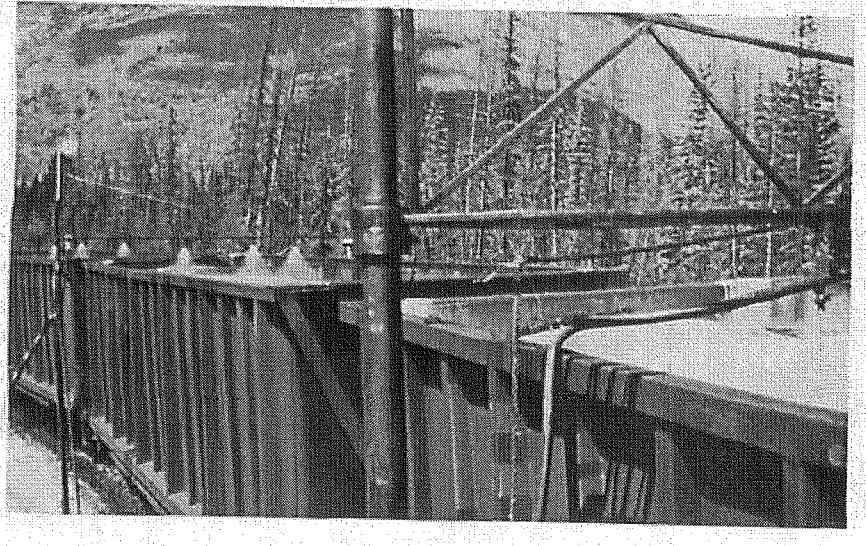


PLATE NO.15: ADDITIONAL WATER SPRAYS TO INCREASE PENETRATION OF BINDER

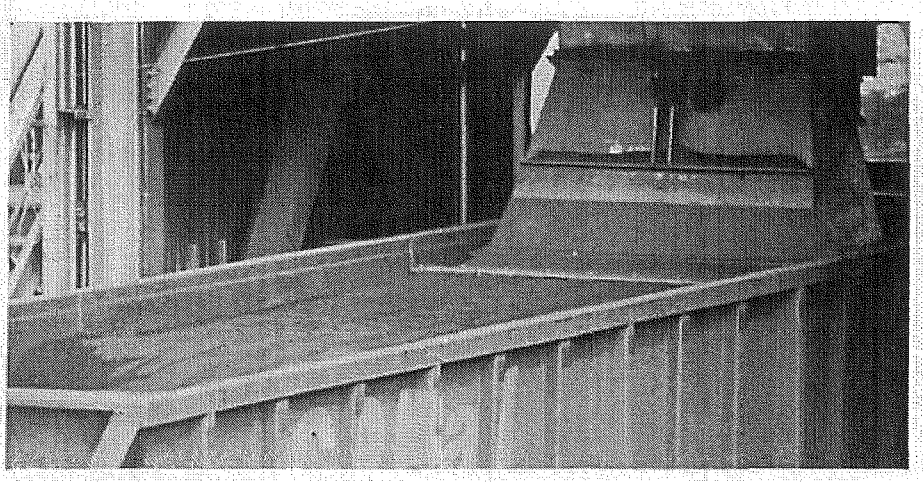


PLATE NO. 16:
MODIFIED LOADING
METHOD

PLATE NO. 17:
COMBINATION OF
FLOODING AND
SPRAYING

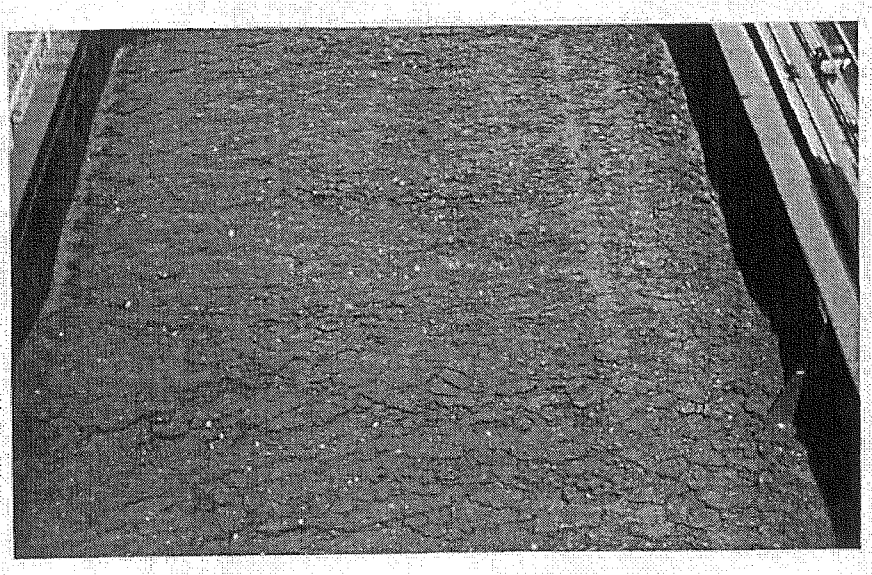


PLATE NO. 18:
PROPERLY LOADED AND
SPRAYED SURFACE

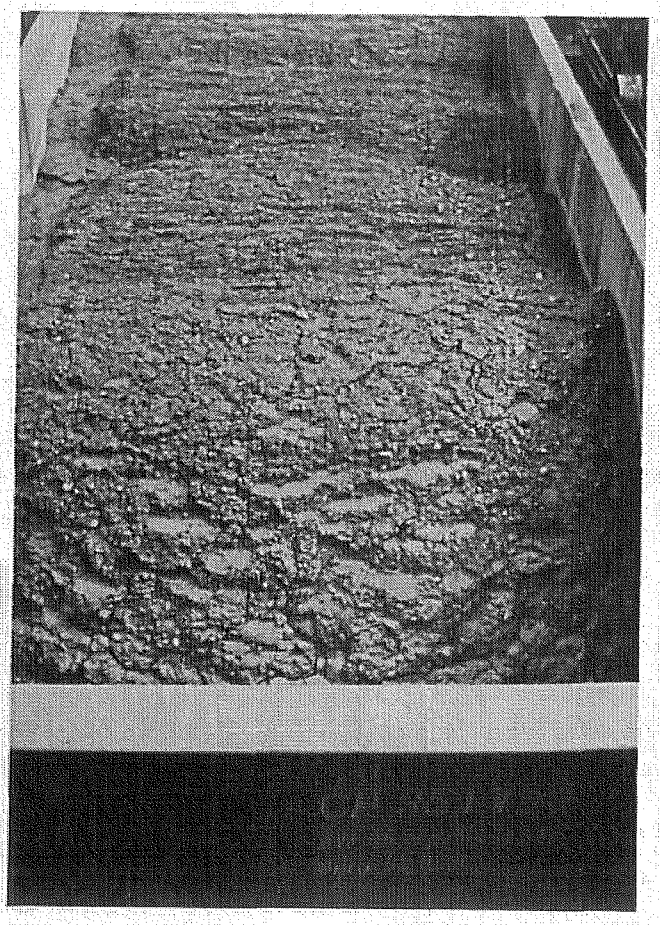


PLATE NO. 19:
EFFECTIVE SPRAYING
ON AN UNEVEN PROFILE

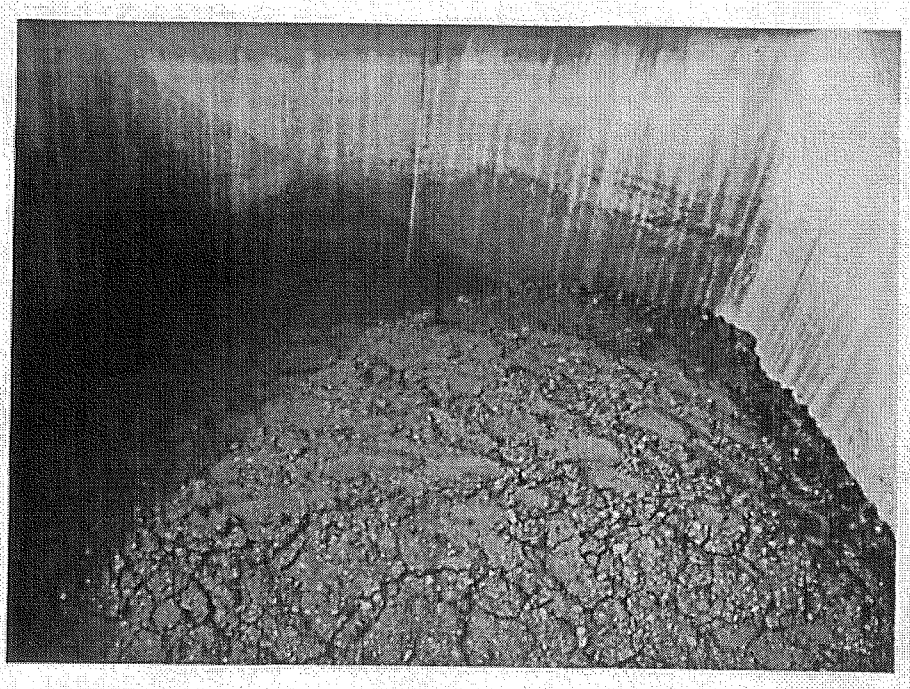


PLATE NO. 20: LIMITED CRUST FAILURE OF SLOPED AREA IN CAR IN PLATE 19

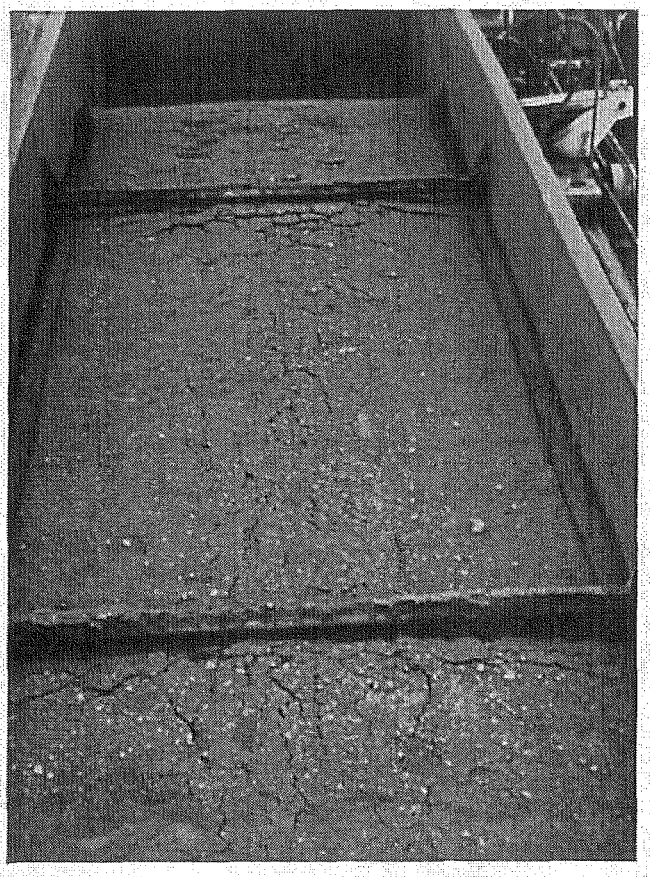
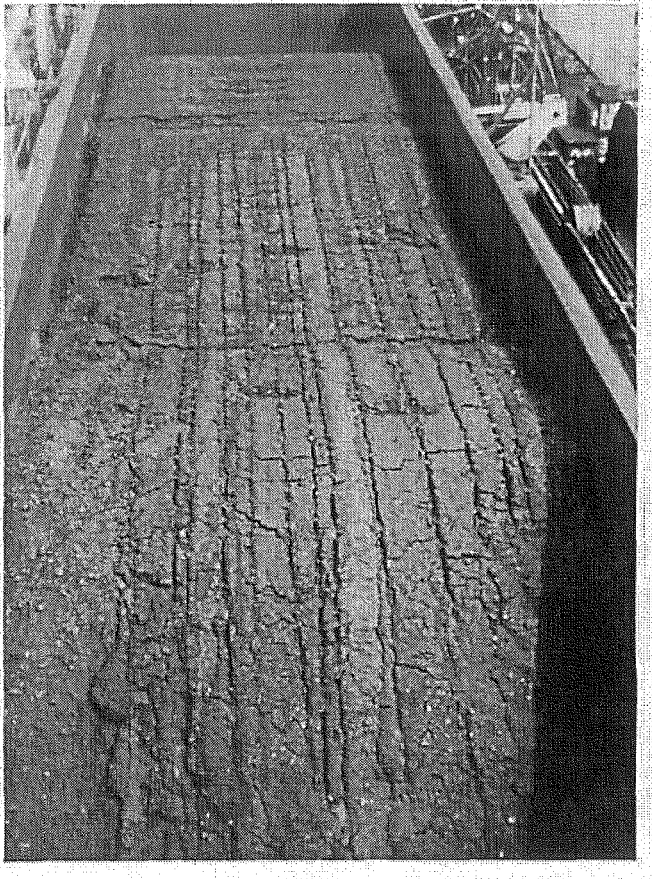


PLATE 21: SLIDE 434-2
MINE B
CAR 349498
DATE SEPT. 3, 1975
COVERAGE 95%

PLATE 22: SLIDE 254-1
MINE C
CAR 351620
DATE Sept. 2, 1975
COVERAGE 70%



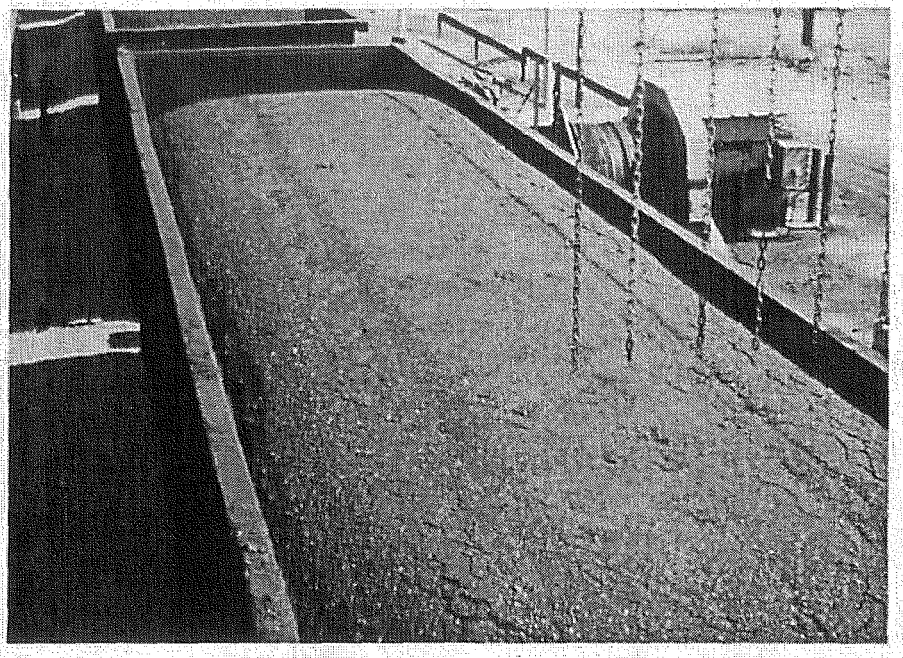
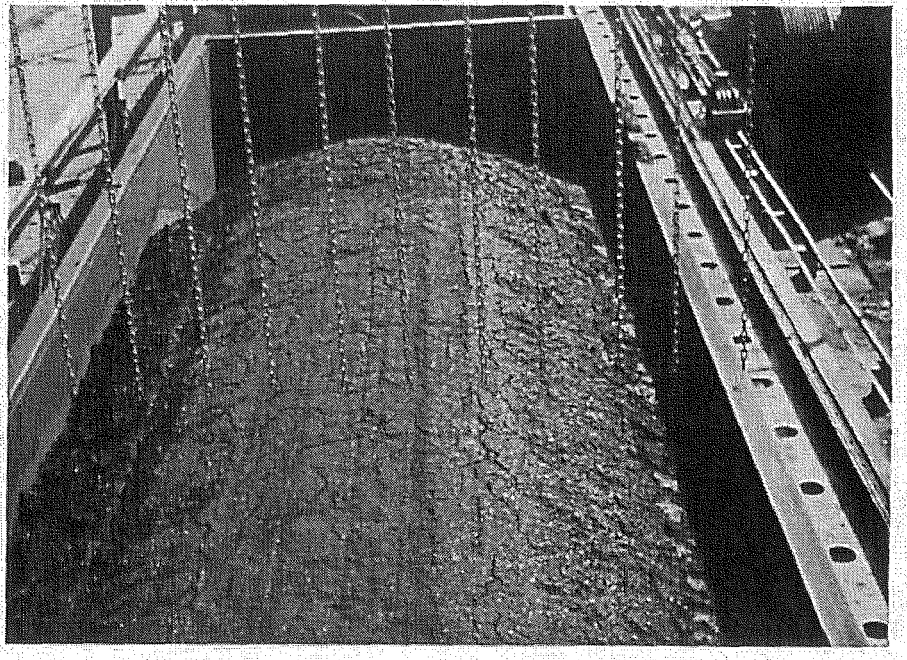


PLATE 23:
SLIDE L154-1
MINE A
CAR 199013
DATE SEPT. 3, 1975
COVERAGE 95%

PLATE 24:
SLIDE M280-10
MINE D
CAR 100945
DATE SEPT. 9,1975
COVEERAGE 80%



World Trade Atlas

US Ports - Exports -Vessel-

2701 Coal; Briquettes, Ovoids Etc. Mfr From Coal

Weight (1000 Metric Tons)

Rank	Port	2010	2011	2012
1	Newport News, VA	14,755	19,082	24,366
2	Norfolk, VA	14,295	18,038	19,621
3	Baltimore, MD	12,525	17,455	17,641
4	Gramercy, LA	3,525	11,952	13,466
5	New Orleans, LA	4,745	6,458	12,005
6	Mobile, AL	8,823	9,197	9,967
7	Toledo-Sandusky, OH	2,400	2,446	2,736
8	Houston, TX	2	439	1,637
9	Buffalo-Niagara Falls, N	1,218	1,282	1,589
10	Long Beach, CA	609	1,230	1,583

SOURCE: WORLD TRADE ATLAS

West Coast Ports
Coal/Petroleum Coke Exports/Imports
2013

US PORT	COMMODITY	DIRECTION	METRIC TONS
BENICIA	PETROLEUM COKE	Export	297,809
LONG BEACH	COAL	Export	1,248,109
LONG BEACH	PETROLEUM COKE	Export	4,137,538
LONGVIEW	PETROLEUM COKE	Export	435,850
LONGVIEW	PETROLEUM COKE	Import	15
OAKLAND	PETROLEUM COKE	Export	6
PORTLAND OR	PETROLEUM COKE	Export	55,958
RICHMOND	COAL	Export	138,974
RICHMOND	PETROLEUM COKE	Export	200,698
RICHMOND	PETROLEUM COKE	Import	5,115
SAN FRANCISCO	PETROLEUM COKE	Export	176,831
SEATTLE	COAL	Import	45,300
SEATTLE	PETROLEUM COKE	Export	11,051
STOCKTON	COAL	Export	569,901
TACOMA	COAL	Import	10,000
TACOMA	PETROLEUM COKE	Export	6,250

Data taken from the “Port Import Export Reporting Service” (PIERS)
http://www.joc.com/group/joc-group/piers

COAL TONNAGE
01/01/1983 - 06/30/2014

Long Beach Bulk Dock
Berths 212-214

1983	291,607
1984	74,118
1985	14,342
1986	14,794
1987	461,036
1988	519,553
1989	1,117,732
1990	806,310
1991	1,056,442
1992	922,561
1993	1,054,435
1/1/94-5/15/94	125,460
5/16/94-12/31/94	893,339
1995	1,652,021
1996	2,356,010
1997	1,313,812
1998	312,140
1/1/99-10/21/99	-
10/22/99-12/31/99	-
2000	-
2001	-
2002	-
2003	-
1/1/04-6/30/04	9,732
7/1/04-12/31/04	-
2005	-
2006	-
2007	-
1/1/08-6/30/08	150,000
7/1/08-12/31/08	144,099
2009	67,016
2010	625,706
2011	1,229,380
2012	1,582,421
2013	1,543,538
2014 *(YTD 6/30/14)*	844,598
TOTAL	**19,182,202**

PETCOKE shipped through Metro Warehouse 1999 thru 6/30/2014

YEAR							TOTAL TONS
2014	17,410						17,410
2013	26,106						26,106
2012	47,775						47,775
2011	79,019						79,019
2010	220	663,313					663,533
2009	176,072	858,809					1,034,881
2008	41,985	597,072					639,057
2007	169,992	811,829	9,982	1,381			993,184
2006	257,318	662,804	14,235				934,357
2005	102,018	498,146	8,815	25,306			634,285
2004	60,567	747,861	887				809,315
2003	914,261						914,261
2002	5,788	39,676	672,418	12,946	26,448	18,365	775,641
2001	113,234	348,778					462,012
2000	171,933	348,613	10,221				530,767
1999	59,008						59,008
					TOTAL TONS		8,620,611

Port of LONG BEACH
The Green Port

Memorandum

Date: July 30, 2013

To: Steve Rubin, Managing Director, Finance & Administration

From: Karl Adamowicz, Director of Real Estate

Subject: Update of Leasing Guidelines

The Port has long standing, Leasing Guidelines that were established in order to support the determination of the appropriate pricing of Port assets under lease. These Guidelines are periodically reviewed to reflect current market conditions and the Port's financial requirements.

Guideline Rent

Currently, the Leasing Guidelines define Guideline Rent as a 10% annual return on the value of land, and a 12% annual return on the value of capital assets. Guideline Rent is considered when valuing (1) land, submerged land, or water, (2) capital improvements, such as buildings, wharves, paving, lighting, rail facilities, and fencing, and (3) equipment, such as cranes and shiploaders.

The rates of return reflect such factors as the Port's cost of capital; operational expenses; costs associated with infrastructure development (in particular non-revenue producing infrastructure); and risk associated with the investment.

These rates are static (a snapshot in time), and as such, are not reflective of actual yield over the lease term or useful life of the asset. Discounted Cash Flow (DCF) models are often utilized as a companion to static calculations to determine yield estimates (Internal Rates of Return) and to support the pricing of Port assets.

Valuation

Land – Land value is established through a periodic review of land sales in selected areas of Los Angeles County, reversionary land value calculations for comparable Port properties, values used by other west coast ports, market conditions, and other factors.

Water and Submerged Land - The same methodology used to support land value is applied to water and submerged land, except that the value of water and submerged land is set at 50% of the value of land. In general, a tenant is charged for water and submerged land when the use is permanent (i.e., permits or leases for tugs, barges, and other vessels moored at the Port), and not when the use is temporary (i.e., vessel calling at a cargo terminal berth).

Improvements/Equipment – Replacement Cost New (RCN) is determined for these assets by considering actual costs or current cost estimates. D epreciation is calculated and considered if appropriate.

The 2013 Recommendations are as follows:

Cargo Related Land (water dependent) ..... $24 per square foot

Submerged Land and Water..... $12 per square foot

Rate of Return for Land and Water..... 10% annually

Rate of Return for Improvements and Equipment..... 12% annually

LJD:

PORT OF LONG BEACH 2006 LEASING GUIDELINES

I. PURPOSE

The Tidelands Trust requires the Port of Long Beach (Port) to use the revenues generated from Port operations to fund development of the Port or Tidelands. This is the primary source of funds for Port development (including development of infrastructure and other non-revenue producing projects), redevelopment and expansion, as well as the repayment of debt. The other source of funds is municipal bonds.

The Port must establish guidelines to determine an appropriate method of determining if the rate of return for land and improvements is adequate. The Leasing Guidelines are to be used as a guide. Deviation from the Guidelines may occur from time to time, and generally any deviation will be accompanied by an explanation or justification. The Leasing Guidelines will be reviewed at least once every five years to reflect changes in port policies [such as the Green Port Policy (GPP) and Clean Air Action Plan (CAAP)], changes in economic conditions, changes in valuation methodology, and other factors.

II. BASIS

The Leasing Guidelines are predicated on the concept that compensation is derived from obtaining a reasonable rate of return on the value of the assets being leased, or "Guideline Rent." Currently, the Leasing Guidelines define Guideline Rent as a 10% annual return on the value of the land, and a 12% annual return on the value of the capital assets.

III. BACKGROUND

The Port of Long Beach (Harbor Department of the City of Long Beach) was established in 1911 and is authorized by the State of California under the Tidelands Trust Act. The state granted the land to the City of Long Beach to provide for the needs of commerce, navigation, recreation, and fisheries, i.e., maritime related uses. Management of the harbor falls primarily under the jurisdiction of the Board of Harbor Commissioners, which is empowered to develop and redevelop port facilities, including dredging and reclaiming land, constructing port-related facilities and infrastructure, and other uses deemed necessary to carry out its responsibilities.

The Board is also empowered to set rates for use and occupancy of the facilities, such as dockage, wharfage, storage, demurrage, pilotage, and other fees and charges for public facilities in the Harbor District.

Ports in the United States operate under different models and economic priorities. Many ports view themselves as an economic development tool of their local government, and may not place emphasis on rate of return for use of assets. Under California law, the Port of Long Beach is required to operate from its revenues, and is not supported by City tax revenues.

IV. PROPERTY AGREEMENTS

There are numerous agreements utilized by the Port that convey the right to use, rent, or lease Port assets. Some of these agreements, such as the Preferential Assignment Agreement, are not commonly utilized in other real estate industries. The most common examples of Port property agreements are:

- Lease
- Preferential Assignment Agreement
- Revocable Permit
- Area Assignment
- Pipeline License

- Right of Entry
- Foreign-Trade Zone Operations Agreement

V. STANDARD CRITERIA

The following criteria are considered to be appropriate in the typical, standard lease; however, the process of agreeing to lease terms is inherently a negotiation. Therefore, some language in each agreement may be tailored to meet the requirements of the Port based on a tenant's specific use of the premises.

- **Term** – A typical term of 20-25 years for cargo terminals is considered the standard. The term of the agreement should be commensurate with the level of investment in the leasehold. Significant capital investment will result in a term at or near the maximum, while a minimal investment will warrant a short term. If the Port owns the land and/or constructs the assets, the Port will require a term sufficient to pay off general obligation bonds, and achieve a return of and a return on the Port's investment. The tenant may also require a term sufficient to amortize its investment, or to secure business to insure profitability.

- **Compensation** – In the case of cargo terminal agreements, compensation is paid through the payment of tariff charges or fees, primarily wharfage (the charge assessed when cargo crosses the wharf), dockage (the charge assessed for docking a vessels at the berth), storage, and demurrage (charges related to the duration that cargo may be stored at the terminal). The total annual sum collected should minimally reflect a return on assets that is consistent with Guideline Rent. In fact, most cargo terminal agreements contain a Guaranteed Annual Minimum (GAM) payment, which is equivalent to Guideline Rent. The GAM may be expressed in dollars or in volumes [i.e. metric revenue ton (MRT), twenty-foot equivalent unit (TEU), or board feet measure (lumber)], per acre or per acres leased. Renegotiation of compensation is required every five years based on Guideline Rent as established by Properties staff or by appraisal.

- **Net Lease** – The Port's standard agreement is based on a "net" lease. A net lease is defined as one which places responsibility for certain lease costs upon the tenant. In particular, the tenant will assume responsibility for payment of applicable real estate taxes, maintenance and repair of the assets leased, and insurance.

- **Maintenance and Repair** – The tenant is typically responsible for all maintenance and repair of the assets leased. Upon completion of new assets, the Port will assume primary responsibility for repair of improvements constructed, subject to warranties provided by manufacturers, for a period of one year. After that date, the tenant will assume all maintenance and repair responsibilities. In addition, Port staff from various divisions will conduct an annual inspection of all container terminal facilities, and determine any deferred maintenance or repair work to be accomplished in compliance with the terms of the agreement.

- **Environmental Covenants** – Properties and Planning staff will determine which environmental mitigation covenants should be included in new leases and lease amendments, and will negotiate the implementation of these covenants in the final agreement. These covenants will be driven by the requirements of the GPP and the CAAP, or other policies which may be adopted by the Board of Harbor Commissioners in the future.

- **Assignment and Subletting** – Generally, no partial or whole assignment or subletting of the premises will be authorized without the written approval of the Board of Harbor Commissioners. The agreement allows the tenant the right to use the premises in accordance with the terms of the lease, and the tenant shall not be entitled to any extra rents, charges, profits, or "bonus value" payable by any assignee or subtenant, or of the tenant's successor in interest.

- **Tariff Application** – Typically, no restrictions will be negotiated which impact the Port's ability to adjust tariff rates. Tariff sharing provides an economic incentive to the tenant to generate more business, while at the same time providing the Port with increased income above the GAM. Tariff payments made by each cargo terminal are reconciled annually, and if the GAM has not been met, the tenant is issued a bill for the "shortfall" amount.

  An advantage to the payment of tariff during the course of the lease year, as opposed to payment of a base rent, is that the Port can directly control the tariff rates and can use this to increase income outside of the lease provisions. When a particular rate is changed or a general rate increase is applied to all tariff items, any change in the tariff rates automatically changes the revenue received by the Port.

- **Other General Terms and Conditions**
  - All agreements over five years in term will be subject to renegotiation of compensation and insurance every five years, pursuant to the terms of the City Charter. This five-year renegotiation will generally be memorialized by a lease amendment, and is specific to those issues. The five-year renegotiation will not be an opportunity to negotiate environmental covenants. In most cases, the rent for subsequent periods should not be less than the rate for the prior period; however, there are limited cases wherein rent relief is warranted and is negotiated for a specific five-year period.
  - Options and rights of first refusal are not generally negotiated, except when special circumstances warrant inclusion in an agreement.
  - Generally, rents established in leases and revocable permits will be subject to an annual Consumer Price Index (CPI) adjustment, but shall not be lower than the rate last approved.
  - New tenants should complete an Application to Use Port Property, which contains financial and credit information, as well as information with respect to the proposed use and investment in the property.
  - A standardized form of agreement will be used as a basis for the final agreement. During the course of the negotiations, some terms and conditions of the standard agreement may be modified.

VI. PARITY

Cargo terminal operations are characterized by general classifications:

a) Container
b) Breakbulk (steel, autos, scrap steel, lumber, paper, and other products that are not shipped in containers)
c) Liquid bulk (crude oil, feedstocks, finished petroleum products)
d) Dry bulk (petroleum coke, coal, sulfur, soda ash)
e) Other

It is the objective of the Properties Division to achieve some degree of parity in the terms and conditions of the agreement within these general classifications. This will prevent one tenant

within a classification (i.e., breakbulk) from having a competitive advantage or disadvantage from the other tenants within the classification. Parity is balanced by other factors, such as Port or tenant investment, assets being leased, rate of return guidelines, or other factors specific to a particular tenant or agreement.

VII. PARTICIPATORY OR PERCENTAGE LEASE STRUCTURE

The Port's cargo terminal agreements include a participatory or revenue sharing compensation structure. In order to explain this further, it is important to understand some of the elements of this structure.

- Guideline Rent – This is the estimated rent for any particular cargo terminal, based on a guideline recommended rate of return on the value of the assets.
- Guaranteed Annual Minimum (GAM) Rent – This is the minimum annual payment needed to achieve the Guideline Rent.
- Breakpoint or Revenue Sharing – This is the point at which the percentage of Guideline Rent (which may differ among classifications) is achieved, above which the Port receives revenue based on a lower percentage of the tariff charge and the tenant retains a larger percentage of the tariff charge.
- Rate of Return – The Leasing Guidelines include a recommended annual rate of return on land and on capital assets, which is used as a basis for determining Guideline Rent.

The Port is committed to being a "full service" port, meaning that we encourage use of the Port's assets for a variety of cargo types. Accordingly, we understand that not all cargo classifications have sufficient margins to pay the same rates. Therefore, it was necessary to provide that some classifications pay 100% of Guideline Rent as the GAM, and others pay less than 100% of Guideline Rent as the GAM. This is not dissimilar to the real estate market in general, which acknowledges that not all property types (i.e., commercial, industrial, residential) have the same value. The percentage of Guideline Rent required to satisfy the GAM is the Port's way of acknowledging that we will not achieve the same return for all classifications.

In addition, the percentage of the tariff paid by the tenant and the percentage retained by the tenant differs within classifications, as does the type of tariff that may or may not be subject to revenue sharing (i.e., dockage, wharfage, etc.). Much of the rationalization for this is due to historic agreements between the Port and its tenants.

The following illustrates the typical participatory or revenue sharing structure of agreements within classifications:

Container Terminals
GAM rent is equal to or greater than 100% of Guideline Rent
50% wharfage until Guideline Rent is paid
25% wharfage thereafter
50% dockage

In the case of container terminals, the Port receives 100% of Guideline Rent as the GAM.

General Cargo Terminals (steel, autos, lumber, tires, etc.)
GAM rent is equal to or greater than 50% of Guideline Rent
100% wharfage and dockage until 50% of Guideline Rent is paid
75% wharfage and dockage until 75% of Guideline Rent is paid
50% wharfage and dockage thereafter

In the case of general cargo terminals, most of the commodities within this classification are not high margin products. Therefore, historically, the GAM rent is equal to at least 50% of Guideline Rent. This means that minimally, the Port will achieve a lower return on assets overall, but maintains its commitment to accommodating a variety of cargo types.

Bulk Cargo Terminals (dry bulk, liquid bulk)
GAM rent is equal to or greater than 100% of Guideline Rent
100% wharfage and dockage

The bulk terminals are an example where we have more prevalent deviations from the Guidelines. As an example, many of the liquid bulk terminals have historically included revenue sharing provisions. The Port does not have an opportunity during the term of the lease to change this to the Guideline above (which does not include any breakpoints) until the lease expires and a new lease is negotiated. It is the goal of the Properties Division to achieve more consistency with the Leasing Guidelines over time.

VIII. VALUATION

The assets valued to establish a basis for determining Guideline Rent are (1) land, submerged land, or water, (2) capital improvements, such as buildings, wharves, paving, lighting, rail facilities, and fencing, and (3) equipment, such as cranes and shiploaders.

Land – Port staff will establish a land value periodically through a review of comparable sales of industrial land, land values used by other West Coast ports, market conditions, and other factors. As there are limited sales of comparable waterfront land available, sales of industrial land will be used as a basis for valuation, and then other value indicators will be used to support the value established.

In some cases, a single wharf may be shared by several tenants. In this case, the overall return on this improvement should be no less than the specified rate. In the event of shared wharves, each tenant may pay a percentage of the overall rate based on the priority they hold, the number of total vessel calls, or other factors.

Water and Submerged Land - The same methodology used to support land value is applied to water and submerged land, except that the value of water and submerged land is equal to 50% of the value of land. In general, a tenant is charged for water and submerged land when the use is permanent (i.e., permits or leases for tugs, barges, and other vessels moored at the Port), and not when the use is temporary (i.e., vessel calling at a cargo terminal berth).

Improvements/Equipment – When improvements are new, valuation will be determined by a “return on investment” approach using the Port’s actual cost of construction and a rate of return as defined in the Leasing Guidelines. When improvements are not new, the basis of valuation will be determined by looking at industry accepted replacement costs for similar construction, and then applying an appropriate depreciation factor.

IX. RATE OF RETURN AND DETERMINATION OF GUIDELINE RENT

Properties staff will establish a rate of return, and this rate will be reviewed periodically as conditions indicate that a review is appropriate or necessary. Changes in the economy, interest rates, or in the real estate market are examples of indicators that may lead to a review of rate of return.

The rate of return will reflect such factors as the Port’s cost of capital; operational expenses; costs associated with infrastructure development (in particular non-revenue producing

infrastructure); and risk associated with the investment. The rate of return will be applied to both land and improvements in a manner appropriate for determination of the Guideline Rent for the agreements in question based on one of the following methods:

a) Rate of return may be applied in a discounted cash flow or internal rate of return analysis
b) Rate of return may be applied as a straight or static return factor

At the onset of the lease, it is important to determine whether the Port's investment will be repaid over time and whether the Port will receive a return on its investment. At this point, method "a" above is utilized in analyzing the Port's proposed investment and the estimated revenue to be generated to confirm that the project return is appropriate.

During the term of the lease, the City Charter requires that compensation is renegotiated for each five-year segment of the term. As this involves a relatively short period of time, a straight line return methodology is applied (without taking into account the present value of the Port's right to receive rent into the future). This analysis involves estimating the value of the assets and applying a rate of return on the value of the land and capital improvements.

X. 2006 RECOMMENDATIONS

Cargo Related Land (water dependent) .....$18 per square foot

Submerged Land and Water ..... $9 per square foot

Rate of Return for Land and Water .....10% annually

Rate of Return for Improvements and Equipment .....12% annually

Finding the right balance between property based and minimum guaranteed throughput rents at ports

Franc J Pigna CRE FRICS CMC, managing director, Aegir, Florida, US

Introduction

From a port authority's standpoint, 'port pricing' is an exercise in determining how to structure leases and how to establish the rent to charge for the use of a port's largest asset – property. Although operating concessions are also a form of rent for land and infrastructure usage, these types of leases are not the main focus of this article – it is the balance of a port's property portfolio.

This article explores, on a cursory basis, the issues, motivations, objectives, challenges and ramifications of two main revenue streams for ports, namely rent on land and facilities and rent charged on cargo throughput.

Unlike asset based rent (which typically is somewhat informally developed by ports and often used as incentives) throughput or toll charges on cargo transported to and from leased facilities and the port are more easily understood by port authorities.

A port's true business

The business model for port authorities has dramatically changed over the last few decades, evolving from port operators charging for services rendered to now asset managers leasing out port assets. This evolution is far from over and will more than likely take port authorities into ever expanding roles as transport leaders and logistics nexuses. One thing is certain though, the role of asset manager will remain a cornerstone of a port authority's business model for a long time to come.

When ports privatized their operations and adopted the 'landlord' model, their revenue stream primarily came from charging rent for their fixed assets, specialized real estate facilities, infrastructure and land; all of which is charged directly in the form of rent or indirectly as in the case of wharfage, dockage and throughput charges.

Throughput versus port property based rent

Throughput charges are also known as 'shared revenue' leases or minimum annual guaranteed rents (MAGR). MAGR is meant to mitigate a port's risks by generating an additional revenue stream to recapture infrastructure investment and other related costs, while the more traditional property based rent covers the financial return obligations of the fixed assets. MAGRs are also meant to balance a tenant's or operator's fixed overheads with a variable rent element and incentivize them to maximize the use of the leased asset in order to better pro-rate the lease costs.

Ports are capital intensive entities requiring long-term leases to parallel the typically long-term financing they use, along with the extended amortization periods required of infrastructure and specialized real estate facilities. Only in this fashion can ports obtain a reasonable return of and on capital values.

Leases for port properties should also be structured so that they are 'financeable' to facilitate releasing tied up equity in property. To accomplish this, leases should have a certain degree of standardization and the ability to generate a reasonably predictable cash flow. In many respects, the aforementioned could easily have described the lease structuring needs of major, regional shopping centers, as their similarities with ports are both numerous and interesting.

Regional shopping centers also are capital intensive operations, requiring long amortization periods and are essentially distribution centers like ports. It is therefore no coincidence that certain similarities exist in the way rent is charged at both. For example, shopping centers have 'anchor' tenants while ports have terminal operators; shopping centers have a 'base' rent equivalent to ports, charging rent for land and facilities; and shopping centers have 'percentage' rents, which are the equivalent of MAGRs.

Also, like regional shopping centers, there is a question as to whether percentage rents or MAGR at ports benefit the landlord, tenant or both. Some believe that MAGR only benefits the port while others argue that, if properly structured, they can 'motivate' ports to not act short-sighted or opportunistic. How so? By motivating them to strive to establish the optimal tenant mix, rather than taking on just any tenant regardless of vacancies. In this fashion the greatest amount of externalities between tenants will result, along with tenants making the maximum use of their leased facilities to better amortize their rent costs. If this optimal tenant mix is accomplished, the port should also generate the maximum possible rent from its property assets and enhance the overall economic value of the port in the process.

Which raises the question, should MAGRs be the 'carrots' and the asset based rent the 'stick'?

Issues

Stated another way if the MAGR is too high, tenants will seek alternative facilities if available; if the MAGR is too low then the port will in effect be subsidizing the tenant's operations. Therefore, a key strategy for ports should be to carefully balance MAGR with property based rent, as this will result in the right balance of fixed and variable costs for tenants and achieve the various aforementioned objectives.

Another issue regarding MAGR, especially in the US, is how ratings agencies view them. One of the main sources of financing the expansion and modernization of ports in the US is through bond financing. Rating agencies look very favourably on ports with relatively high levels of MAGR. Typical statements found in port reviews might be: 'Financial operations at the port are stable and are supported by long-term leases' and 'strong minimum annual guarantees (MAGs)' or 'it is important to note that all of the port's tenants are currently operating above MAG levels.'

Clearly these agencies see MAGR as a revenue floor mitigating cargo throughput and revenue swings caused by economic shifts. From this perspective, many agencies use MAGR to debt service and to capital plan ratios to indicate how the port's MAGR level bolsters their financial position and an argument can well be made for this. However, this might also be influencing ports to raise MAGR to inordinately high levels, resulting in port tenants (especially at bulk and commodity ports) not achieving the

requisite MAGR cargo thresholds during their lease terms and possibly resulting in some unintended consequences.

This type of situation might create the perception on behalf of tenants that there is little difference between MAGRs and property based rent, resulting in two potentially detrimental situations for ports.

Firstly, tenants might wrongly perceive that MAGRs are just another form of rent for the facilities they lease, leading them to mentally bundle MAGR and property based rent. If this occurs then port located facilities will certainly seem expensive when compared with industrial land and facilities near ports. This line of thought can and has undermined many a port's ability to charge proper MAGR and properly recapture its extensive investment in infrastructure, security and other elements, which is what differentiates port facilities from industrial estates and parks besides the sea – land interface (and presumably is the reason tenants pay a premium to be located there).

Secondly, in instances when MAGR levels (or throughput commitments) are too low, this can result in the failure of major port infrastructure projects or in them not being built. A case in point was the US $150 million LAXT super coal terminal at the Port of Los Angeles, which was built to service the Japanese coal market and was commissioned in 1997. It was the only West Coast coal terminal capable of handling a 275,000 deadweight tonnage vessel. The Japanese refused to commit to a high enough throughput tonnage to make it financially viable and it eventually was shut down in 2003.

Notwithstanding the fact that China and India were not major buyers of coal then, the shutting down of LAXT shows the negative impact of not having proper levels of either MAGR or minimum throughput commitment. This especially comes across when taking into account that, in just nine years from LAXT being shut down, China and India have become major coal importers, there are now major concerns surrounding nuclear facilities in Japan and coal exports to Asia from North America are exponentially expanding. One example of this is Cloud Peak Energy's Wyoming Powder River Basin coal (high British thermal unit/low sulphur 'clean' coal) exports to Asia increasing to three million metric tonnes in 2010, from one million in 2008.

Challenges

'Rent' is a charge levied for the use of a resource or asset provided by the port authority in a manner and amount which will recoup costs (for example, for capital, operations, repairs and maintenance and management) and produce adequate returns of and on capital invested (preferably valued at market, but sometimes at replacement costs). The goal then should be to properly structure rents to result in the efficient use of the asset or resource and attain the port authority's financial and socio-political goals and objectives as well. This brings up the issue as to how rents should be established at ports for land and facilities.

Typically rents at ports are based on a 'historical' land value basis, having little to do with current 'market' values or are equally misguided by being based on so called 'comparables' for seemingly related industrial properties not located within a port's perimeter.

From an economic concept standpoint, the value of an asset is the opportunity cost of not using that asset or alternatively the capitalized value or the present value of the future stream of net benefits. By its very nature then, asset valuation is forward looking.

Therefore, the focus on a port's asset valuation should be on current market values rather than historic ones. These asset valuations should be undertaken at appropriate frequencies for the asset class in question to ensure values are current and rents based on these values will produce real economic rates of return. Only in this fashion will lease rates equal or exceed the opportunity cost of capital and ensure that appropriate investment levels are maintained at the port (based on a competitive market basis rather than a government subsidy).

Furthermore determining asset values should be done by using appropriate comparable sale benchmarks of true 'like kind' assets (which probably are not located anywhere near the port) and appropriate financial assumptions in the income approach. For this, the valuer or appraiser needs to have an innate understanding of the unique business dynamics found at ports, which is rare to find in the industry.

By not having proper market rents and lease structures for land and facilities, ports can significantly diminish the economic value of these important assets, lose revenue (not to mention control) and potentially subsidize a tenant's operations.

The balance

Just because ports operate under a 'landlord' model does not necessarily mean that there is or can be a common set of goals and objectives for most ports or a suggested balance between asset and throughput based rents.

The degree of emphasis each port places on 'economic development' (a catchall phrase for subsidized government engineering for job growth), asset management goals and objectives (for example, revenue, profit, returns from fixed and capital assets) and generating the highest possible cargo throughput and corresponding revenues, varies greatly from one 'like kind' port to the other. Therefore, until there is an alignment of port authority operating structures (maybe when 'corporatization' of port authorities becomes more prevalent?) the 'perfect' balance between asset and throughput based rents will vary greatly and need to be tailored to each facility.

Conclusions

The balance between asset and throughput based rent is a subject requiring more careful scrutiny by ports today, as the marketplace is increasingly demanding a higher degree of financial sophistication from ports and ports need to release the substantial amounts of tied up equity in their real estate and property. This makes it imperative that a port authority not short change itself by asking too low a base rent on land and facilities or by making itself less competitive through inordinately elevated MAGR.

In the end, the objective of shared rent leases or MAGR from a port's perspective is to strike a balance so that tenants will use their leased facilities at ports to the maximum possible potential, ports will not subsidize a tenant's operations and port assets will reach appropriate target rates of returns over specified periods of time.

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TITLE PAGE

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TARIFF NO. 4
NAMING
RATES, RULES AND REGULATIONS
GOVERNING THE
PORT OF LONG BEACH
CALIFORNIA
FOR
PILOTAGE, DOCKAGE, WHARFAGE, WHARF DEMURRAGE
AND WHARF STORAGE, FREETIME, BERTH AND AREA ASSIGNMENTS,
PUBLIC LANDING, WATER AND ELECTRICITY, HANDLING EQUIPMENT
AND GENERAL RULES AND REGULATIONS

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RULE 34-C: SECTION 3 - WHARFAGE (Continued)

either of them, or who shall willfully make a false declaration on a statement, including the Container Report of the total number of vans/containers discharged and/or loaded, wharfage statement or manifest shall be subject to the penalties prescribed in law and in this Tariff. Any person who fails to submit a statement, including the Container Report of the total number of vans/containers discharged and/or loaded or statement of wharfage charges within the times provided therefor shall pay to the City a penalty charge of 1/30 of two per cent (2%) per day of the total wharfage charges due subject to a minimum penalty charge of two per cent (2%) of total wharfage charges.

TERM: WHARFAGE, CHARGES FOR

Wharfage charges, as provided in this section, are in addition to all other charges contained in this tariff and shall, unless otherwise provided, be assessed against all merchandise except that afforded free wharfage under the provisions of Item 304 and shall be paid in accordance with Item 708.

Wharfage charges shall be assessed on a per unit basis, rounded off to the nearest whole unit.

For further definitions: European Cargo see Item 149.

ARTICLES	RATES IN CENTS	ITEM NO.
Merchandise, N.O.S.	614	310

All cargo in vans or containers (See Item 163), shall be assessed wharfage according to the outside length of the van or container in accordance with the following rate schedule, in dollars, subject to Notes 1, 2 & 3: 315

Container Size in Feet	Inbound General	Inbound European	Outbound General	Outbound European	Exception Cargo
20 ft.	178	158	137	121	119
35-40 ft.	327	291	238	210	154
45 ft. & over	413	376	413	376	154

Note 1: Exception cargo rates named herein shall apply to vans and containers moving in the Inbound and Outbond directions and applies to General and

RULE 34-C: SECTION 3 - WHARFAGE (Continued)

European cargos.

Note 2: When and where necessary, TEU's will be converted to metric revenue tons by dividing the applicable container rate by the applicable NOS tonnage rate.

Note 3: Exception cargos shall include Viz:
Automobiles, CKD (See Item 178)
Bananas, N.O.S.
Beverages, canned or bottled
Borax
Boric acid
Borates
Tile; Ceramic, Marble, Slate
Cotton and cotton linters in bales
Diatomaceous earth
Fish and Shellfish, fresh or frozen
Foodstuffs, canned or bottled
Hay and hay cubes
Hides and Skins
Machinery, heavy, industrial Viz:
Air conditioning machines and parts
Boilers and parts
Compressors; air and parts
Condensers; heat exchangers and parts
Fire fighting equipment, sprinklers and parts
Generators; gas, electric, steam and parts
Machines; bottle and can capping, filling and labeling and parts
Refrigerators, freezers and parts
Turbines; steam, water, accessories and parts
Water coolers, fountains and parts
Meat and poultry, fresh and frozen
Metal scrap
Paper; waste

ARTICLES	RATES IN CENTS	ITEM NO.
Merchandise, N.O.S., in bulk, per 1,000 kilograms	237	354
Scrap Metal, in bulk, per 1,000 kilograms When shipped from assigned containment area on Pier T	224	355
Merchandise, N.O.S., in bulk per 1,000 kilograms to vessels at Pier F and Pier G by means of belt conveyor type mechanical shiploaders or by gravity chutes (except:		356

RULE 34-C: SECTION 3 - WHARFAGE (Continued)

beans; feed, animal and poultry; grain and grain products; oil seeds, peas, pellets, alfalfa, beet pulp, copra and cotton seed; safflower seeds, seeds, soybeans and related products, processed or unprocessed), subject to Notes 1 & 2:	146	
Petroleum Coke & Sulfur, in bulk, per 1,000 kilograms, subject to Notes 1 & 2:	182	
Coal, in bulk, per 1,000 kilograms, subject to Notes 1 & 2:	120	
Note 1: Merchandise transferred directly from rail to shiploader, per 1,000 kilograms	44	
(Effective April 1, 2012): Merchandise transferred directly from rail to shiploader, per 1,000 kilograms	89	
(Effective July 1, 2012): Merchandise transferred directly from rail to shiploader, per 1,000 kilograms	134	
Note 2: Commodities utilizing mechanical shiploaders are subject to Item 515		
Cement in bulk, from vessels by means of the mechanical ship unloader, per 1,000 kilograms	139	358
Cement in two-ton bags per 1,000 kilograms	614	359
For minimum annual volume of 400,000 metric tons from a single shipper in a consecutive twelve-month period, per 1,000 kilograms	496	
For volume in excess of 400,000 metric tons from a single shipper in a consecutive twelve-month period, per 1,000 kilograms	441	

NOTE 1: Consecutive twelve-month period commences on the date of first vessel discharge. Subsequent consecutive, twelve-month periods commence on the day following the anniversary date of the first vessel discharge.

NOTE 2: Minimum annual volume rates apply

RULE 34-C: SECTION 3 - WHARFAGE (Continued)

only to cargo that is moved off the dock within applicable free time. NOTE 3: Minimum annual volume rates are available only with advance approval by Port of suitable security/bond or escrow to cover difference between regular rate and minimum annual volume rate. The Port has absolute discretion in approving or disapproving security.		
Gypsum rock, in bulk, from self unloading vessels at Berth B83	139	360
Salt, in bulk, per 1,000 kilograms	139	362
Manganese and silico manganese ores, in bulk, per 1,000 kilograms	181	363
Bananas, per 1,000 kilograms	546	368
Beer, and other malt liquors, in bottles or cans per 1,000 kilograms		369
Local	714	
European Cargo	646	
Buildings, modules, including mobile, per cubic meter	456	370
Other than knocked down (Note Applicable)		
Buildings, modules, including mobile, other than knocked down, minimum 150 cubic meters per unit, moving in multiple unit moves, per vessel, per bill of lading		
5 - 10 units, per cubic meter	414	
11 - 20 units, per cubic meter	333	
21 - 40 units, per cubic meter	254	
Over 40 units, per cubic meter	172	
Note: Multiple unit moves of less than 150 cubic meters per unit may apply volume rates subject to minimum cubic measurement per unit.		
Cargo vans or containers (See item 163, empty, per van or container, on the overall length, in feet):		374

RULE 34-C: SECTION 3 - WHARFAGE (Continued)

	Over	But Not Over		
	0	20 ft.	970	
	20 ft.	44 ft.	1940	
	44 ft.		2364	
European Cargo	0	20 ft.	873	
	20 ft.	44 ft.	1746	
	44 ft.		2222	
Food or food preparations, canned or bottles per 1,000 kilograms				375
Local			727	
European Cargo			666	
Fish and Fish Pet Food, canned or in bottles per 1,000 kilograms			679	375.1
Fresh fruit and fresh vegetables, per 1,000 kilograms			642	376
European Cargo			581	
Forklift trucks, charges shall be assessed per, 1,000 kilograms or cubic meters, whichever shall yield the greater revenue. (See Notes 1 and 2)			614	377
Note 1: applicable to breakbuld lots of minimum 100 units per shipment discharged from a single vessel during a single port teminal call.				
Liquids, except petroleum and petroleum products and water, as provided in Section Five, in bulk, per 1,000 kilograms from and to vessel through private line			176	378
Livestock or other animals, per head			618	380
Lumber and lumber products, not containerized, viz.:				382
Logs and timber, in foreign and offshore Trades, Per 1,000 ft. B.M.			1092	
Lumber in foreign and offshore Trades,				
per 1,000 ft. B.M.			1092	
per cubic meter			462	
per 1,000 kilograms			635	
Lumber, logs and timber, in North American Pacific Coast Trade				

RULE 34-E: SECTION 5 - MISCELLANEOUS CHARGES (Continued)

construct from the South Coast Air Quality Management District. User will obtain all necessary permits to operate and will conduct all operations in strict compliance with said permits to operate and with rules and regulations of that body.

ITEM: 515

TERM: CHARGES FOR USE OF MECHANICAL SHIPLOADERS AT PIER G, BERTHS G212-215; AND PIER F, BERTHS F210-211

Charges are for the use (subject to Item 500) of mechanical shiploaders, ship trimmer and air pollution control equipment only. Operators, cleaning, utilities, maintenance, repairs and any supplemental equipment to be furnished by the user; wharfage, dockage and other tariff charges are in addition to the charges named in this item.

	(I)
Mechanical Shiploaders....	45 cents per 1,000 kilograms or fraction thereof of cargo handled.

NOTE: The Pier G mechanical shiploader consists of 60-inch conveyor belt feeding systems with 72-inch and 54-inch belting respectively for the traveling bulkloaders at Berths G212-215.

The Pier F mechanical shiploader consists of a 60-inch transfer gallery conveyor, an overhead 60-inch shipping gallery conveyor, a traveling shiploader with a 60-inch conveyor and includes all feeding systems and associated structures and equipment which travel at Berths F210-211.

ITEM: 520

TERM: CHARGES FOR USE OF CONTAINER CRANES

Charges are for use (subject to Item 500) of cranes and lifting beams only; other supplementary equipment, operators, utilities, maintenance and repairs to be furnished by the user; wharfage, dockage and other tariff charges are in addition to charges named in this item.

Container Cranes.....	$441.00 per hour, per crane. $110.00 per 15 minute increments or fraction thereof, per crane.

EXCEPTION 1: Where container cranes are preferentially assigned or owned, the furnishing of

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Long Beach, California
Long Beach Harbor Department; Ports/Port Authorities

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Long Beach, California
Long Beach Harbor Department; Ports/Port Authorities

Credit Profile		
US$325.0 mil harbor rev short-term notes (Long Beach Harbor Dept) ser 2014C due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed
US$38.675 mil harbor rev rfdg bnds (AMT) (Long Beach Harbor Dept) ser 2014A due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed
US$21.21 mil harbor rev rfdg bnds (non-AMT) (Long Beach Harbor Dept) ser 2014B due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed

Rationale

Standard & Poor's Ratings Services assigned its 'AA' long-term rating to the Long Beach Harbor Department (the Port of Long Beach, the issuer, or the port), Calif.'s $39 million series 2014A senior revenue refunding bonds, $21 million series 2014B senior revenue refunding bonds, and $325 million series 2014C senior revenue short-term notes. In addition, Standard & Poor's affirmed its 'AA' long-term rating and underlying rating (SPUR) on the port's senior debt outstanding. The outlook on all ratings is stable.

In our opinion, the ratings reflect the following credit strengths:

- Senior debt service coverage (DSC) that is projected to be no less than 2.23x, based on projections we consider achievable, which is further supported by a formal board-adopted debt policy that requires the port maintain at least 2x all-in DSC;
- A liquidity position that is expected to be maintained at levels near or above 600 days' operating funds on hand per a board-adopted debt policy that requires the port maintain at least 600 days' cash on hand;
- The port's substantial cargo-handling facilities and surface transportation connections, which support the port's position as the second-busiest container port in the U.S.; and
- The port's significant local market with capacity for growth and a capable, experienced management team.

These strengths are partially offset, in our opinion, by:

- The nature of the port sector's business, which is dependent on factors outside of the port's control, such as service decisions by shipping lines, economic cycles, and competitive pressures from other ports and transportation services, and
- Future higher debt levels and lower cash levels from funding a $4.0 billion capital improvement plan (CIP), which could result in lower-than-projected DSC levels should a future downturn in container traffic occur.

The senior bonds are secured by a pledge of gross revenues of the harbor department. The port currently has approximately $602 million in long-term debt. The port's existing senior debt, including the 2014A, 2014B, and 2014C bonds, are fixed rate. The series 2014C short-term notes have an expected final maturity of Nov. 15, 2017, and

according to our criteria, issues with maturities of more than 36 months will generally receive long-term ratings.

Outlook

The stable outlook reflects our anticipation that the port's financial metrics will remain strong and liquidity will remain good. A significant decrease in container traffic volumes or future DSC below 2.0x would be a credit risk, in our view. We do not expect to raise the ratings during the two-year outlook period given the large capital plan and future additional debt.

Issuer

The port is operated by the harbor department, which is an enterprise fund of the City of Long Beach (AA-/Stable issuer credit rating). The department is overseen by a five-member board of harbor commissioners, who are appointed by the mayor and subject to city council approval; board members serve overlapping six-year terms. The board appoints an executive director to act as chief executive of the department. In our view, the port benefits from an experienced management team, which implements conservative financial policies.

Historically under city charter, the city council could designate that up to 10% of the net income of the harbor department be transferred to the city's tidelands operating fund (TOF). In November 2010, the voters passed Measure D, which changed the formula for the calculation of the transfer to the TOF to 5% of operating revenue from 10% of net income. The transfer requires the approval of the board of harbor commissioners. Following the implementation of Measure D, the transfers to TOF for fiscal years 2013, 2012, and 2011 were $17.3 million, $16.7 million, and $17.3 million, respectively. Measure D also transferred the oil fields and their operations from the port to the Gas and Oil Department of the City of Long Beach. Gross oil revenue for the port was $54.2 million in fiscal 2010. In our opinion, the port has remained financially strong despite the effects of Measure D on the department's revenues.

Port Description

The Port of Long Beach is a large port with substantial cargo-handling facilities located next to the Port of Los Angeles in Southern California. The port is the second-busiest seaport in the U.S. The port's primary business is container cargo, with revenues derived from container shipping representing approximately 80% of total operating revenue in fiscal year 2013. Other cargo types handled at the port include dry bulk cargo, petroleum/liquid bulk cargo, and general cargo including automobiles, forest products, and steel. The port operates as a landlord port, whereby port tenants perform all cargo-handling activities at the port and pay the department tariff charges pursuant to long-term lease agreements.

The port benefits from good surface transportation connections, which facilitate the distribution of local and discretionary cargo. Two major rail lines -- BNSF Railway Company and Union Pacific Railroad Company -- serve the port. Rail connections were, in our view, enhanced by the opening of the Alameda Corridor in 2002. The Alameda Corridor is a 20-mile-long multiple track rail system overseen by the Alameda Corridor Transportation Authority

(ACTA) that links the ports of Long Beach and Los Angeles with the central rail yards near downtown Los Angeles. These rail yards link the main lines with the central and southern transcontinental routes of the railroads. The rail companies also have use of the Intermodal Container Transfer Facility (ICTF), which is operated by Union Pacific and owned by a separate joint powers authority between the department and the Port of Los Angeles. The ICTF is located four miles from the Port of Long Beach and allows for the transfer of containers between trucks and railcars. Interstate 710 links the port with the interstate highway system.

Port Activity

Container traffic has fluctuated recently due to the economic recession. After a long period of strong growth, container traffic decreased substantially in fiscal years 2008 and 2009. Total twenty-foot equivalent units (TEUs) handled at the port totaled 5.3 million in fiscal year 2009, down 28% from the peak level of 7.4 million in fiscal year 2007. As economic recovery began, annual container traffic in fiscal years 2010 and 2011 improved by 12.4% and 6.1%, respectively, to a total of 6.3 million. However, in fiscal 2012, TEUs declined by 7% to 5.9 million, but fiscal 2013 was a very strong year with 6.6 million TEUs, or a 13.5% increase over fiscal 2012, which we consider an impressive rate of growth.

Lease Agreements

Because the Port of Long Beach is a landlord port, its cargo operations are handled by long-term lease tenants. Under these agreements, the tenants pay port tariff charges (wharfage, dockage, storage, etc.) and other various rental payments. The port's top 10 revenue producers have agreements whose terms ranging from month to month through 2028. Most of the terminal operator preferential assignment agreements contain minimum annual guarantees (MAGs), mitigating some risk of reduced cargo activity during the life of the agreement. In fiscal 2013, MAGs represented about $236 million in operating revenue, providing senior DSC of 1.7x (based on MAGs net of operating expenses). In general, the terminal operator tenants are responsible for operations and maintenance (O&M) expenses for the property and facilities, while the port maintains the piers, wharves, bulkheads, retaining walls, and fender systems.

Finances

Operating revenue trends have roughly tracked cargo traffic, with fiscal year 2013 revenue totaling $346 million, up 3.7% from fiscal year 2012. Operating expenses, excluding depreciation, were up 11.5% in fiscal year 2013, totaling $98 million, but the same as fiscal years 2009 and 2010. DSC has historically been very strong, in our view. Net revenues provided 3.1x coverage of debt service in fiscal year 2013 (and also fiscal year 2012).

We understand that the port plans to issue additional debt in the future to finance a portion of its CIP. The increased debt service associated with the future debt is forecast to decrease projected coverage, based on management's projections. However, management expects DSC will remain at least 2x as required by a debt policy that the board of harbor commissioners adopted in October 2011. In our view, coverage of this level is achievable, though any future downturn in container traffic would likely weigh on financial metrics. Lower-than-projected coverage levels as a result

of increased debt levels would be a credit risk, in our opinion.

The port's liquidity position is strong, in our view. Unrestricted cash totaled $240 million as of fiscal year end 2013, representing about 896 days' operating funds on hand. Although we consider cash to be strong, cash has declined from previous very strong levels as some capital spending has been funded from port operations. We do not consider this to be a concern. The debt policy discussed above also requires the port to maintain at least 600 days' cash on hand. We consider the debt policy to be a credit strength and additional indication of management's fiscal prudence.

In fiscal year 2011 the port made a $3 million "shortfall advance" to the Alameda Corridor Transportation Authority (ACTA) pursuant to the port's operating agreement with ACTA (and the Port of Los Angeles) to make up any debt service deficiencies associated with the Alameda Corridor project. ACTA repays its bonds primarily through use fees and container charges collected from the railroads operating at the Port of Long Beach and Port of Los Angeles. Under operating agreements with ACTA, the port jointly agreed with the Port of Los Angeles to equally make up for any shortfalls between ACTA's user fee revenues and obligations, including debt service on ACTA's bonds through shortfall advances. These shortfall advances are capped at 40% of ACTA's total annual obligations; each port is responsible for 20%. The shortfall advance obligation is subordinate to debt service and O&M expenses. The port expects that it (and the Port of Los Angeles) may be required to make one or more additional shortfall advance between 2015 and 2037. We do not view these obligations as a credit risk at this time.

Debt Provisions

In our opinion, the bond legal provisions provide adequate security to bondholders. The port's senior bonds are secured by a gross pledge of port revenues. Subordinate obligations are secured by port revenues remaining after the payment of principal and interest on senior debt (including deposits to the senior debt service reserve funds). Revenues are derived from port operations, including collection of wharfage charges, dockage charges, and lease and property rentals, as well as investment earnings not dedicated to specific funds under the indenture. The city has covenanted in the master resolution to generate revenues to provide at least 1.25x senior maximum annual debt service (MADS) coverage, and to be sufficient to meet all other department obligations. In our analysis, we measure DSC provided by net revenues, after paying O&M expenses, rather than coverage provided by gross revenue.

The flow of funds requires that all revenues be directed to the city treasurer, who in turn transfers all applicable amounts in the following order for the payment of the principal and interest on senior obligations, the senior debt service reserve (if needed), principal and interest on subordinate obligations, the subordinate debt service reserve (if needed), department O&M expenses, and finally to any lawful purpose. Each series of bonds are additionally secured by separate debt service reserve funds, if any.

The additional bonds test allows for future debt on parity with the port's outstanding debt based on projected revenues. Specifically, the additional bonds test requires that projected net revenues for the 12-month period beginning after bond-financed improvements are in operation must provide at least 1.25x MADS coverage on existing and planned additional senior debt and 1.00x coverage on all obligations. Net revenues can reflect any additional revenues expected from the project or other sources and can assume, without limitation, a reduction in operating and

maintenance expenses and any increase in port charges that have taken effect.

Pursuant to a supplemental senior resolution, the port will be amending certain provisions of the master senior resolution. The proposed amendments will not become effective until all of the outstanding senior bonds have been defeased; currently the final maturity on outstanding debt is 2027, although debt may be retired earlier. The proposed amendments include the allowing of special facility debt, under certain circumstances, and also the right to accelerate the payment of principal of and interest on the senior bonds, under certain circumstances. We consider both proposed amendments to be credit neutral for senior and subordinate obligations under the circumstances that are described in the proposed amendments.

Capital Improvement Program, Future Debt, and The Transportation Infrastructure Finance and Innovation Act (TIFIA)

The port maintains a 10-year CIP, which currently covers projects planned for fiscal years 2014 through 2023. The total estimated cost of the plan is approximately $4.0 billion. Funding sources include additional revenue bonds, port revenues, federal and state grants, and other sources. According to management, the port plans to issue about $1.6 billion in senior bonds, subordinate obligations, and a subordinate TIFIA loan to finance the CIP through fiscal year 2023. Management has stated that the port will likely issue its next new-money revenue bonds in fiscal 2015.

The series 2014C notes are expected to be paid by a draw on a $325 million subordinate TIFIA loan that is currently expected to close in May or June 2014. If the funds from the TIFIA loan are not available, management will use a combination of one or all of the following: cash, bonds, or lines of credit. Management believes the TIFIA loan will lower the cost of debt financing, which will allow the port to undertake other projects in its CIP. TIFIA funding is also expected to create a window at the lower to intermediate yield curve to lower the port's cost of financing in the future. We understand the port wishes to use the beneficial aspects of the TIFIA program by minimizing front-end principal amortization and reserving the portion of the principal amortization in the later years. The port intends to pay the TIFIA loan on a 35-year term, with the majority of principal repaid during the last five years.

The increased debt service associated with the future debt is forecast to decrease projected coverage, based on management's projections. However, management expects all-in DSC, including the future subordinate TIFIA loan, to remain at least 2x as required by a debt policy that the board of harbor commissioners adopted in October 2011. Management expects the DSC will fall to its lowest level in fiscal 2019, with senior coverage at 2.23x and all-in coverage at 2.01x. In our view, coverage of this level is achievable, though any future downturn in container traffic would likely weigh on financial metrics. Future coverage levels that are lower than projected over the next few years as debt levels increase would be a credit risk, in our view. The debt policy discussed above also requires the port to maintain at least 600 days' cash on hand. We consider the debt policy to be a credit strength and additional indication of management's fiscal prudence.

Related Criteria And Research

Related Criteria

- USPF Criteria: Port Facilities Revenue Bonds, June 13, 2007
- USPF Criteria: Bond Anticipation Note Rating Methodology, Aug. 31, 2011

Ratings Detail (As Of April 15, 2014)		
Long Beach ('Long Beach Harbor Dept)		
Long Term Rating	AA/Stable	Affirmed
Long Beach Harbor Dept port rev		
Unenhanced Rating	AA(SPUR)/Stable	Affirmed
Long Beach (Long Beach Harbor Dept)		
Unenhanced Rating	AA(SPUR)/Stable	Affirmed

Many issues are enhanced by bond insurance.

RatingsDirect®

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Long Beach Harbor Department; Ports/Port Authorities

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Long Beach, California
Long Beach Harbor Department; Ports/Port Authorities

Credit Profile		
US$325.0 mil subord harbor rev bnds (Long Beach Harbor Dept) (Tifia Loan) due 11/15/2051		
Long Term Rating	AA-/Stable	New

Rationale

Standard & Poor's Ratings Services assigned its 'AA-' long-term rating to the Long Beach Harbor Department (the Port of Long Beach, the issuer, or the port), Calif.'s $325 million Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) loan, which is subordinate to the senior debt. In addition, Standard & Poor's affirmed its 'AA' long-term rating and underlying rating (SPUR) on the port's senior debt outstanding. The outlook on all ratings is stable.

In our opinion, the ratings reflect the following credit strengths:

- Senior debt service coverage (DSC) and total DSC that is projected to be no less than 2.23x and 2.01x, respectively, based on projections we consider achievable, which is further supported by a formal board-adopted debt policy that requires the port maintain at least 2x total DSC;
- A liquidity position that is expected to be maintained at levels near or above 600 days' operating funds on hand per a board-adopted debt policy that requires the port maintain at least 600 days' cash on hand;
- The port's substantial cargo-handling facilities and surface transportation connections, which support the port's position as the second-busiest container port in the U.S.; and
- The port's significant local market with capacity for growth and a capable, experienced management team.

These strengths are partially offset, in our opinion, by:

- The nature of the port sector's business, which is dependent on factors outside of the port's control, such as service decisions by shipping lines, economic cycles, and competitive pressures from other ports and transportation services, and
- Future higher debt levels and lower cash levels from funding a $4.0 billion capital improvement plan (CIP), which could result in lower-than-projected DSC levels should a future downturn in container traffic occur.

The senior bonds are secured by a pledge of gross revenues of the harbor department. The subordinate loan is expected to be secured by port revenues remaining after the payment of principal and interest on senior debt (including deposits to the senior debt service reserve funds). The port currently has approximately $535 million in senior debt outstanding. The port's existing senior debt is fixed rate.

The port is entering into a $325 million TIFIA loan with the federal government, as lender, with an expected close on May 21, 2014. The loan would be used to finance a portion of the cost of the port's replacement of the Gerald Desmond Bridge.

Outlook

The stable outlook reflects our anticipation that the port's financial metrics will remain strong and liquidity will remain good. A significant decrease in container traffic volumes or future total DSC below 2.0x would be a credit risk, in our view. We do not expect to raise the ratings during the two-year outlook period given the port's large capital plan and future additional debt.

Issuer

The port is operated by the harbor department, which is an enterprise fund of the City of Long Beach (AA-/Stable issuer credit rating). The department is overseen by a five-member board of harbor commissioners who are appointed by the mayor and subject to city council approval; board members serve overlapping six-year terms. The board appoints an executive director to act as chief executive of the department. In our view, the port benefits from an experienced management team, which implements conservative financial policies.

Historically under city charter, the city council could designate that up to 10% of the net income of the harbor department be transferred to the city's tidelands operating fund (TOF). In November 2010, the voters passed Measure D, which changed the formula for the calculation of the transfer to the TOF to 5% of operating revenue from 10% of net income. The transfer requires the approval of the board of harbor commissioners. Following the implementation of Measure D, the transfers to the TOF for fiscal years 2013, 2012, and 2011 were $17.3 million, $16.7 million, and $17.3 million, respectively. Measure D also transferred the oil fields and their operations from the port to the Gas and Oil Department of the City of Long Beach. Gross oil revenue for the port was $54.2 million in fiscal 2010. In our opinion, the port has remained financially strong despite the effects of Measure D on the department's revenues.

Port Description

The Port of Long Beach is a large port with substantial cargo-handling facilities located next to the Port of Los Angeles in Southern California. The port is the second-busiest seaport in the U.S. The port's primary business is container cargo, with revenues derived from container shipping representing approximately 80% of total operating revenue in fiscal year 2013. Other cargo types handled at the port include dry bulk cargo, petroleum/liquid bulk cargo, and general cargo including automobiles, forest products, and steel. The port operates as a landlord port, whereby port tenants perform all cargo-handling activities at the port and pay the department tariff charges pursuant to long-term lease agreements.

The port benefits from good surface transportation connections, which facilitate the distribution of local and discretionary cargo. Two major rail lines -- BNSF Railway Company and Union Pacific Railroad Company -- serve the port. Rail connections were, in our view, enhanced by the opening of the Alameda Corridor in 2002. The Alameda Corridor is a 20-mile-long multiple track rail system overseen by the Alameda Corridor Transportation Authority (ACTA) that links the ports of Long Beach and Los Angeles with the central rail yards near downtown Los Angeles. These rail yards link the main lines with the central and southern transcontinental routes of the railroads. The rail

companies also have use of the Intermodal Container Transfer Facility (ICTF), which is operated by Union Pacific and owned by a separate joint powers authority between the department and the Port of Los Angeles. The ICTF is located four miles from the Port of Long Beach and allows for the transfer of containers between trucks and railcars. Interstate 710 links the port with the interstate highway system.

Port Activity

Container traffic has fluctuated recently due to the economic recession. After a long period of strong growth, container traffic decreased substantially in fiscal years 2008 and 2009. Total twenty-foot equivalent units (TEUs) handled at the port totaled 5.3 million in fiscal year 2009, down 28% from the peak level of 7.4 million in fiscal year 2007. As economic recovery began, annual container traffic in fiscal years 2010 and 2011 improved by 12.4% and 6.1%, respectively, to a total of 6.3 million. However, TEUs declined by 7% in fiscal 2012 to 5.9 million, but fiscal 2013 was a very strong year with 6.6 million TEUs, or a 13.5% increase over fiscal 2012, which we consider an impressive rate of growth.

Lease Agreements

Because the Port of Long Beach is a landlord port, its cargo operations are handled by long-term lease tenants. Under these agreements, the tenants pay port tariff charges (wharfage, dockage, storage, etc.) and other various rental payments. The port's top 10 revenue producers have agreements whose terms ranging from 2016 through 2051. Most of the terminal operator preferential assignment agreements contain minimum annual guarantees (MAGs), mitigating some risk of reduced cargo activity during the life of the agreement. In fiscal 2013, MAGs represented about $236 million in operating revenue, providing senior DSC of 1.7x (based on MAGs net of operating expenses). In general, the terminal operator tenants are responsible for operations and maintenance (O&M) expenses for the property and facilities, while the port maintains the piers, wharves, bulkheads, retaining walls, and fender systems.

Finances

Operating revenue trends have roughly tracked cargo traffic, with fiscal year 2013 revenue totaling $346 million, up 3.7% from fiscal year 2012. Operating expenses, excluding depreciation, were up 11.5% in fiscal year 2013, totaling $98 million, but the same as fiscal years 2009 and 2010. DSC has historically been very strong, in our view. Net revenues provided 3.1x coverage of debt service in fiscal year 2013 (and also fiscal year 2012).

We understand that the port plans to issue additional debt in the future to finance a portion of its CIP. The increased debt service associated with the future debt is forecast to decrease projected coverage, based on management's projections. However, management expects total DSC will remain at least 2x as required by a debt policy that the board of harbor commissioners adopted in October 2011. In our view, coverage of this level is achievable, though any future downturn in container traffic would likely weigh on financial metrics. Lower-than-projected coverage levels as a result of increased debt levels would be a credit risk, in our opinion.

The port's liquidity position is strong, in our view. Unrestricted cash totaled $240 million as of fiscal year-end 2013, representing about 896 days' operating funds on hand. Although we consider cash to be strong, cash has declined from previously very strong levels as some capital spending has been funded from port operations. We do not consider this to be a credit risk. The debt policy discussed above also requires the port to maintain at least 600 days' cash on hand. We consider the debt policy to be a credit strength and an additional indication of management's fiscal prudence.

In each of fiscal years 2011 and 2012 the port made a $3 million "shortfall advance" to the ACTA pursuant to the port's operating agreement with ACTA (and the Port of Los Angeles) to make up any debt service deficiencies associated with the Alameda Corridor project. ACTA repays its bonds primarily through use fees and container charges collected from the railroads operating at the Port of Long Beach and Port of Los Angeles. Under operating agreements with ACTA, the port jointly agreed with the Port of Los Angeles to equally make up for any shortfalls between ACTA's user fee revenues and obligations, including debt service on ACTA's bonds through shortfall advances. These shortfall advances are capped at 40% of ACTA's total annual obligations; each port is responsible for 20%. The shortfall advance obligation is subordinate to debt service and O&M expenses. The port expects that it (and the Port of Los Angeles) may be required to make one or more additional shortfall advance between 2015 and 2037. We do not view these obligations as a credit risk at this time.

Debt Provisions

In our opinion, the bond legal provisions provide adequate security to bondholders. The port's senior bonds are secured by a gross pledge of port revenues. Subordinate obligations are secured by port revenues remaining after the payment of principal and interest on senior debt (including deposits to the senior debt service reserve funds). Revenues are derived from port operations, including collection of wharfage charges, dockage charges, and lease and property rentals, as well as investment earnings not dedicated to specific funds under the indenture. The city has covenanted in the master senior resolution to generate revenues to provide at least 1.25x senior maximum annual debt service (MADS) coverage, and to be sufficient to meet all other department obligations. In our analysis, we measure DSC provided by net revenues, after paying O&M expenses, rather than coverage provided by gross revenue.

The flow of funds requires that all revenues be directed to the city treasurer, who in turn transfers all applicable amounts in the following order for the payment of the principal and interest on senior obligations, the senior debt service reserve (if needed), principal and interest on subordinate obligations, the subordinate debt service reserve (if needed), department O&M expenses, and finally to any lawful purpose. Certain of the series of senior bonds are additionally secured by separate debt service reserve funds.

The additional senior bonds test allows for future debt on parity with the port's outstanding senior debt based on projected revenues. Specifically, the additional bonds test requires that projected net revenues for the 12-month period beginning after bond-financed improvements are in operation must provide at least 1.25x MADS coverage on existing and planned additional senior debt and 1.00x coverage on all obligations. Net revenues can reflect any additional revenues expected from the project or other sources and can assume, without limitation, a reduction in operating and maintenance expenses and any increase in port charges that have taken effect.

Pursuant to a supplemental senior resolution, the port is amending certain provisions of the master senior resolution. The amendments will not become effective until all of the senior bonds outstanding prior to the sale of the series 2014A and 2014B bonds have been defeased; currently the final maturity on outstanding debt is 2027, although debt may be retired earlier. The amendments include the allowance of special facility debt, under certain circumstances, and also the right to accelerate the payment of principal of and interest on the senior bonds, under certain circumstances. We consider both amendments to be credit neutral for senior and subordinate obligations under the circumstances that are described in the amendments.

CIP, Future Debt, And TIFIA

The port maintains a 10-year CIP, which currently covers projects planned for fiscal years 2014 through 2023. The total estimated cost of the plan is approximately $4.0 billion. Funding sources include additional revenue bonds, port revenues, federal and state grants, and other sources. According to management, the port plans to issue about $1.6 billion in senior bonds, subordinate obligations, and the $325 million subordinate TIFIA loan to finance the CIP through fiscal year 2023. Management has stated that the port will likely issue its next new-money revenue bonds in fiscal 2015.

The TIFIA loan will be used to fund partially the replacement of the existing physically deteriorated Gerald Desmond Bridge, located at the southern end of State Route 710 in Los Angeles County. The new cable-stayed bridge will have six lanes (the existing bridge has five) and will be constructed adjacent to the existing bridge, which will be demolished upon completion. Management states that the new bridge will ease traffic congestion issues and will meet the region's transportation and cargo improvement needs. Management estimates that nearly 15% of the nation's waterborne cargo passes across the bridge, as a critical-access route for the ports of Long Beach and Los Angeles, downtown Long Beach, and local communities.

The project costs for the bridge total $1.3 billion. Funding sources include:

- Federal Highway Bridge Program, $211.8 million;
- SAFETEA-LU, $100 million;
- Federal Appropriations Act, $5.8 million;
- State Highway Operation & Protection Program (federal), $46.5 million;
- Trade Corridor Improvement Fund (federal), $299.8 million;
- Regional Surface Transportation Improvement Fund (federal), $11.3 million;
- TIFIA, $325 million;
- Corridor Mobility Improvement Account (state), $153.7 million;
- Los Angeles County Proposition C (local), $17.3 million; and
- Port funds (local), $117 million.

The port's pending series 2014C senior harbor revenue short-term notes are expected to be paid by a draw on the $325 million subordinate TIFIA loan. Management has stated that it will not sell the 2014C notes until the TIFIA loan closes. If the funds from the TIFIA loan are not available, management will use a combination of one or all of the following: cash, bonds, or lines of credit. Management believes the TIFIA loan will lower the cost of debt financing, which will allow the port to undertake other projects in its CIP. TIFIA funding is also expected to create a window at

the lower to intermediate yield curve to lower the port's cost of financing in the future. We understand the port wishes to use the beneficial aspects of the TIFIA program by minimizing front-end principal amortization and reserving the portion of the principal amortization in the later years. The port intends to pay the TIFIA loan on a 35-year term, with the majority of principal repaid during the last five years.

We understand management projects escalating senior debt service requirements and lower liquidity levels as a result of the port issuing $1.6 billion (includes $325 million of a subordinate TIFIA loan) in debt and drawing on cash reserves to fund its $4.0 billion, 10-year CIP. The increased debt service associated with the future debt is forecast to decrease projected coverage, based on management's projections. However, management expects all-in DSC, including the TIFIA loan, will remain at least 2x as required by a debt policy that the board of harbor commissioners adopted in October 2011. Management expects the DSC will fall to its lowest level in fiscal 2019, with senior coverage at 2.23x and all-in coverage at 2.01x. In our view, coverage of this level is achievable, though any future downturn in container traffic would likely weigh on financial metrics. We understand that management may enter into special facility agreements in the future that could have the effect of lowering revenues currently included in its long-term forecast. Management has stated that total coverage (including the TIFIA loan) will be maintained at or above 2x, which we consider to be acceptable at the current rating levels. However, lower-than-projected coverage levels due to an increase in debt levels would be a credit risk, in our view. The debt policy discussed above also requires the port to maintain at least 600 days' cash on hand. We consider the debt policy to be a credit strength and additional indication of management's fiscal prudence.

Related Criteria And Research

Related Criteria

USPF Criteria: Port Facilities Revenue Bonds, June 13, 2007

Ratings Detail (As Of May 16, 2014)

Long Beach (Long Beach Harbor Dept)		
Long Term Rating	AA/Stable	Affirmed
Long Beach Harbor Dept port rev		
Unenhanced Rating	AA(SPUR)/Stable	Affirmed
Long Beach (Long Beach Harbor Dept)		
Unenhanced Rating	AA(SPUR)/Stable	Affirmed
Long Beach, California		
Port of Long Beach, California		
Long Beach (Port of Long Beach) harbor rev rfdg bnds (non-AMT) (Port of Long Beach) ser 2014B due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed
Long Beach (Port of Long Beach) harbor rev rfdg bnds (AMT) (Port of Long Beach) ser 2014A due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed
Long Beach (Port of Long Beach) harbor rev short-term notes (Port of Long Beach) ser 2014C due 05/15/2027		
Long Term Rating	AA/Stable	Affirmed

Many issues are enhanced by bond insurance.

SP4009733

1992 SESSION
ENGROSSED

SENATE JOINT RESOLUTION NO. 1

Senate Amendments in [ ] - February 5, 1992

Continuing the Special Subcommittee Studying Measures to Reduce Emissions from Coal-carrying Railroad Cars as a joint subcommittee.

Patrons—Schewel and Marye

Referred to the Committee on Rules

WHEREAS, in recent years, some residents whose dwellings are in close proximity to certain rail lines have reported problems with fugitive coal dust; and

WHEREAS, coal dust blowing off trains onto nearby homes and automobiles is said to be a costly nuisance that also might pose health hazards to affected residents; and

WHEREAS, Senate Bill 566 and House Bill 1163 were introduced at the 1991 Session of the General Assembly to address these citizen concerns; and

WHEREAS, a special subcommittee was established to further study the issues presented by the legislation during the interim; and

WHEREAS, the Special Subcommittee determined that citizens and businesses residing along these lines have experienced periodic problems arising from coal dust emissions and that a prompt, responsible, and practical solution needs to be found; and

WHEREAS, the panel was informed of a study to be conducted for a Virginia-based rail coal carrier to determine the extent of the fugitive coal dust problem, to isolate possible causes, to conduct test-site evaluations, and to examine potential remedies; and

WHEREAS, the Special Subcommittee recognizes the initial efforts of the rail and coal industries to address the problem and believes that the findings of the industry study could lead to a timely and equitable solution; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Special Subcommittee Studying Measures to Reduce Emissions from Coal-carrying Railroad Cars be continued as a joint subcommittee to review the results of the industry study and to make appropriate recommendations, if necessary. The membership of the Joint Subcommittee shall remain the same as the Special Subcommittee, with any vacancy to be filled [~~in the same manner as the original appointment.~~ by the Senate Committee on Privileges and Elections, the Speaker of the House of Delegates and the Governor, as appropriate.]

The Joint Subcommittee shall complete its work in time to submit its findings and recommendations to the Governor and the 1993 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

The indirect costs of this study are estimated to be $8,465; the direct costs of this study shall not exceed $4,860.

Implementation of this resolution is subject to the approval and certification of the Joint Rules Committee. The Committee may withhold expenditures or delay the period for the conduct of the study.