BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Finance Docket No. 35305

ARKANSAS ELECTRIC
COOPERATIVE CORPORATION – PETITION
FOR DECLARATORY ORDER

REPLY EVIDENCE AND ARGUMENT OF UNION PACIFIC RAILROAD COMPANY

PUBLIC VERSION – CONFIDENTIAL AND HIGHLY CONFIDENTIAL INFORMATION HAS BEEN REDACTED

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ATTACHMENTS

Table of Short-Hand References to Parties of Record who Filed Opening Evidence and Argument

Party of Record	Short-hand Reference
Ameren Energy Fuels and Services Company	Ameren
American Public Power Association ("APPA"), Edison Electric Institute ("EEI"), and National Rural Electric Public Power Association ("NRECA")	Associations
Arkansas Electric Cooperative Corporation	AECC
BNSF Railway Company	BNSF
National Coal Transportation Association	NCTA
Norfolk Southern Railway Company	NS
Texas Municipal Power Agency	TMPA
TUCO Inc.	TUCO
Union Pacific Railroad Company	Union Pacific
Western Coal Traffic League ("WCTL") and Concerned Captive Coal Shippers ("CCCS")	Coal Shippers

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OVERVIEW

The opening comments submitted by a variety of shippers and associations who all oppose BNSF's coal dust tariff rules[1] shared three principal themes: (1) skepticism that coal dust presents serious concerns to railroad track or operations for a variety of reasons; (2) even if coal dust were a legitimate concern, traditional railroad maintenance practices and undercutting sufficiently address coal dust found on railroad right-of-way; and (3) even if the circumstances call for preventative efforts by shippers, BNSF's tariff rules are nevertheless unreasonable because their standards are arbitrary and lack scientific validity, fail to account for bottom-loss of coal, and cost too much especially since in the shippers' view, they have already paid for maintenance. In addition, the

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[1] The following shippers and associations filed opening evidence and argument: Arkansas Electric Cooperative Corporation ("AECC"); Western Coal Traffic League ("WCTL") and Concerned Captive Coal Shippers ("CCCS") (collectively "Coal Shippers"); American Public Power Association ("APPA"), Edison Electric Institute ("EEI"), and National Rural Electric Public Power Association ("NRECA") (collectively "Associations"); National Coal Transportation Association ("NCTA"); Ameren Energy Fuels and Services Company ("Ameren"); Texas Municipal Power Agency ("TMPA"); and TUCO Inc. ("TUCO"). Other parties of record filing opening evidence and arguments include BNSF Railway Company ("BNSF"), Union Pacific Railroad Company ("Union Pacific"), and Norfolk Southern Railway Company ("NS").

Associations raised a unique argument. They questioned whether the Board could even address the unreasonable practice allegations without a prior Federal Railroad Administration ("FRA") decision on the safety implications of coal dust.[2]

Union Pacific Railroad Company ("Union Pacific") anticipated many of these allegations in its Opening Evidence and Argument ("Opening"). Our reply focuses on the following themes: In Part I, we show that the BNSF tariff rules address a real threat to safe and reliable transportation. In Part II, we explain that most coal losses come from the tops of railcars. In Part III, we discuss that deferred maintenance and defective track design do not explain the Joint Line derailments in 2005. In Part IV, we show that the opponents' criticism of the cost of the BNSF tariff rules mismatches costs and benefits. In Part V, we demonstrate that shippers have not already paid Union Pacific to deal with coal dust. In Part VI, we explain why Ameren's request that the Board direct how railroads may change rates is improper. And in Part VII, we demonstrate that referral to the FRA of issues concerning BNSF's tariff rules is not warranted.[3]

Union Pacific's arguments are supported by the accompanying reply verified statements of independent expert witness Dexter N. McCulloch, Senior Vice President

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2 Coal Shippers incorrectly assert that Union Pacific opposed WCTL's motion to intervene "on grounds that discussions between the railroads and WCTL concerning the Coal Dust Tariff Items 'pos[ed] antitrust risk.'" (Coal Shippers Op. Ev. at 9.) While Union Pacific filed a Reply to WCTL's request to intervene in order to correct a misleading statement made by WCTL, it did not object to intervention by WCTL or any other party.

3 Union Pacific will not address opponents' criticisms of how BNSF developed the integrated dust value or that the BNSF tariff rules do not state the consequences for noncompliance. Union Pacific played no role in those decisions, and the BNSF tariff rules do not apply to Union Pacific customers. (BNSF Op. Ev. at 26.) On opening, Union Pacific addressed a similar BNSF coal dust operating rule that does apply to Union Pacific, but stated that it would object if BNSF attempted to stop its trains for noncompliance and explained why that would be counterproductive. (UP Op. Ev. at 17-20.)

and Director of Railroad Services for Shannon & Wilson, Inc., a geotechnical and environmental engineering company ("McCulloch Reply VS"), Rex A. Beck, General Manager-Freight Car of Union Pacific ("Beck Reply VS"), and Douglas Glass, Vice President and General Manager-Energy of Union Pacific ("Glass Reply VS").

Mr. McCulloch explains that coal dust's particular threat to track stability has recently been recognized, describes why coal dust is significantly more dangerous by volume than other contaminants, and concludes that coal dust has accelerated the undercutting cycles by a factor of two or three. Mr. Beck addresses the argument raised by various shippers and associations that BNSF's tariff rule is unreasonable because it fails to address potential coal loss from railcar bottoms. Mr. Glass describes how Coal Shippers' cost-benefit analysis is incomplete and flawed. He also responds to claims that Union Pacific's current railroad rates cover the full cost of removing coal dust and should not be allowed to increase.

ARGUMENT

I. Coal Dust Emitted from Railcars Is a Serious Threat to Track and Rail Service

Opponents accuse BNSF and its tariff rules of "arbitrarily fixat[ing] on coal dust." (Coal Shippers Op. Ev. at 19; *see* AECC Op. Ev. at 4, 8, 15 ("Coal dust is not some mysterious substance that magically and unexpectedly undermines the track structure and causes it to fail.")[4] Our reply will show that they ignore the scientific evidence that coal dust's physical characteristics render it particularly dangerous to track stability; fail to

[4] *Cf.* Associations Init. Com. at 4 ("How do shippers and the STB know that it was coal dust alone, and not the manner in which the Joint Line was constructed or maintained, that was the cause of the derailments in 2005, or that is the source of the alleged continuing problem with coal dust on the Joint Line?").

recognize that the volume of coal dust is the critical measure of its threat; and overlook that the difficulty of detecting coal dust combined with how quickly it absorbs water makes it critical to keep coal dust out of the track bed.

A. Coal Dust's Unique Characteristics Pose a Threat to Track

Recent scientific studies have identified physical characteristics that make coal dust especially dangerous and that distinguish it from other substances found in ballast. Although published papers about this research were produced in discovery, the opening comments of opponents ignored this data.[5] Since 2006, Professor Erol Tutumluer has been examining and studying the properties of coal dust. (BNSF Op. VanHook VS at 13.) Through his research, Prof. Tutumluer concluded that various fouling agents have different effects on ballast based on the fouling agent's "physical and mechanical properties." (BNSF Op. Tutumluer VS at 7.) As for coal dust's impact on ballast, Prof. Tutumluer determined that "coal dust is one of the worst fouling agents" that has ever been studied. (*Id.* at 5, 8.) Ballast that is exposed to coal dust fouls very quickly. (*Id.* at 8; BNSF Op. Ev. at 12.) Track components and track geometry deteriorate rapidly when ballast contaminant fines such as coal dust accumulate in a ballast section, weakening the track structure and reducing the ballast's structural rigidity "to the strength properties of the fouling materials." (McCulloch Reply VS at 4; *see generally* UP Op. Ev. at 6-7.)

Additionally, the rate at which ballast become fouled on a coal line is greatly accelerated by coal dust. (McCulloch Reply VS at 9.) And coal dust contributes to accelerated ballast fouling even hundreds of miles from the Southern Powder River Basin

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[5] Several of the parties submitting comments participated in earlier litigation with Union Pacific about the causes of the Joint Line failure. As a result they were aware of this research and that these papers were published, which makes their passing over this information inexplicable.

("SPRB") mines. (*Id.* at 10.) Dexter N. McCulloch, an engineering geologist from Shannon & Wilson, Inc., a geotechnical and environmental engineering company, concludes that more frequent undercutting is required to address coal dust fouling in ballast. Historically, where "heavy haul railroads might expect a cycle of undercutting of ballast every 10 to 12 years," "when this same track is exposed to coal dust, that cycle is shortened by a factor of two to three" (and perhaps shortened even further in the areas of switches or bridges). (*Id.* at 2, 11.)

BNSF's in-the-field observations concur with Mr. McCulloch's findings. BNSF's Assistant Vice-President and Chief Engineer-Systems Maintenance and Planning, William VanHook, stated that in one area on the Joint Line, BNSF discovered that "brand new track installed with clean materials . . . had been contaminated with coal dust in a few months." (BNSF Op. VanHook VS at 14.) Moreover, BNSF attributes more frequent undercutting than historical maintenance cycles suggest to rapid accumulation of coal dust and, according to Mr. VanHook, some Joint Line locations may need to be undercut "as often as every two or three years." (*Id.*; *see also* BNSF Op. VanHook VS at Exs. 2, 5.)

The science and engineering data leave no doubt: coal dust in ballast threatens track stability.

B. Volume, Not Weight, Is the Correct Measure of Coal Dust's Importance

Opponents cite the presence of five other substances that foul ballast as proof that BNSF pays too much attention to coal dust. (Coal Shippers Op. Ev. at 20-21 (referencing "naturally occurring dust; breakdown of ballast and concrete ties due to mechanical forces; brake shoe dust; and traction sand"); AECC Op. Ev. at 9, Nelson VS at 11

(referencing other sources of ballast fouling, including sand and dust).) {[redacted]}

Mr. McCulloch explains that it takes far less coal dust by weight to completely foul ballast, compared to other contaminants. (McCulloch Reply VS at 2.) His recent study results conclude that for the purposes of determining the impact of coal dust, coal dust must be measured according to its contribution to the volume, not by weight. (*Id.* at 2, 7-8.)

Coal dust's unique characteristics differentiate it from other types of ballast contaminants. (*Id.* at 8, 10.) Coal dust is far less dense and has a lower bulk specific gravity than other ballast-fouling contaminants. (*Id.* at 7.) What may appear like a modest amount of coal dust relative to other contaminants, even "as little as 15% of coal dust by weight is sufficient to completely fill the ballast void spaces leading to fouling." (*Id.* at 2.) Thus, by focusing {[redacted]} opponents of the coal dust mitigation rules seriously understate the risk that coal dust represents to ballast. (*See* Coal Shippers Op. Ev. at 21-23, Crowley VS at 8-10.)

C. Coal Dust Is Often Hidden and Can Quickly Destabilize Track if It Becomes Wet

Opponents' engineering witnesses treat coal dust as if it were like other fouling agents found in heavy haul track that can be addressed with normal maintenance cycles. For instance, Mr. McDonald indicates that coal dust is merely one of a variety of the materials that accumulate along the Orin Subdivision. (Coal Shippers Op. McDonald VS at 6.) Mr. DeBerg also fails to differentiate between coal dust and other contaminants

when he lists coal dust among "a number of contributing factors" that can cause ballast to become contaminated ("such as blowing dirt, blowing coal dust or other products of what is being hauled falling off of loaded and empty cars and locomotives," including traction sand) (AECC Op. DeBerg VS at 6). They overlook that the difficulty in locating exactly where coal dust has accumulated combined with how quickly coal dust can destabilize track when wet requires undercutting vigilance. The difficulty in detecting where coal dust has accumulated and the speed with which it becomes saturated with water and destabilizes track magnifies coal dust's danger as a foulant. Coal dust quickly works its way into the ballast and hides. So even if the ballast looks clean upon a visual inspection, the area may still contain coal dust. (UP Op. Connell VS at 14, 18; BNSF Op. VanHook VS at 14; BNSF Op. Ev. at 3, 13, 21-22.) In addition to the difficulties of detecting the location where coal dust might be hiding, coal dust especially "can have a highly destabilizing effect on rail ballast," especially when it becomes wet. (BNSF Op. VanHook VS at 13; *see* also BNSF's Counsel's Ex. 14; UP Op. Ev. at 6-7; UP Op. Connell VS at 13-14.) Coal is highly "plastic" and "has the potential to absorb water like a sponge." (BNSF Op. Tutumluer VS at 7.) As Prof. Tutumleur explains, "coal dust particles that accumulate in the ballast void spaces and have high potential to absorb moisture" can foul ballast very quickly. (*Id.* at 8.)

The shippers and associations attempt to minimize the impact of coal dust but the studies and research conducted by academics and scientists, as well as the observations made by individuals from both railroads, report otherwise. Coal dust is a very real and very damaging foulant to the ballast and to the track's integrity.

II. Bottom Loss Is Not the Major Source of Coal Dust Deposits on Track

Various shippers challenge the efficacy and reasonableness of BNSF's coal dust tariff rules because those rules do not address coal loss coming from the bottoms of bottom-dump cars, but that argument is a red herring. (Coal Shippers Op. Ev. at 23-24; Associations Init. Com. at 5, 7.) Most coal deposits originate from the tops of open-top coal cars. Bottom loss is minimized by the predominant use of gondolas and Union Pacific's efforts to prevent bottom loss of coal. For example, Union Pacific watches for leaking cars, pulls them for repair by owner, and has spent millions upgrading and repairing its own fleet. Finally, these factors combined with the continuing rapid accumulation of coal dust on track illustrate that top loss is the major source of coal dust emissions.

A. NCTA Committee Study and Joint Line Photographs Show that the Tops of Open-Top Coal Cars Emit Lots of Coal Dust

Tests conducted in 2005-2006 by a task force consisting of the National Coal Transportation Association ("NCTA") and its members, Union Pacific and BNSF found that significantly more coal dust escapes from the tops of railcars than from the bottoms. (Beck Reply VS at 2.) The task force formed three committees, one of which was the Car Quality Standards Committee. After conducting various tests, that NCTA committee found a "significant difference between coal losses by weight from the top of a railcar compared to losses from the bottom," with most coal losses coming from the top of the railcars. (*Id.* at 2-3, Ex. RAB-1; *see also* BNSF_COALDUST_0021650 to 0021667, at 0021653 [Counsel Ex. 5].) While an untreated rail car lost approximately 225 pounds of coal from its open top, it lost only 38 pounds of coal from the bottom. (*Id.* at 3, Ex.

RAB-1 at 0032983; *see also* BNSF_COALDUST_0033084-33115, at 33109-110; [Counsel Ex. 6].)

Additionally, photographs taken of coal trains operating on the Joint Line visually demonstrate that the tops of open-top coal cars emit large amounts of coal dust (see exemplar photograph below). (BNSF Op. Ev. at 3-4 & Counsel's Ex. 4.)

B. Bottom Loss Is Not a Major Source of Coal Dust Emissions Due to the Predominant Use of Gondolas on Union Pacific's Line and Preventative Measures Taken By Union Pacific

The type of cars used to move SPRB coal over Union Pacific's lines minimizes the possibility that coal will fall out of the bottom. And Union Pacific has done what it can to prevent the loss of coal from the bottom of cars through inspections of all SPRB coal cars and maintenance practices on its own fleet of cars.

1. All SPRB coal cars are open on top and most SPRB coal moves in gondolas with enclosed bottoms.

Two-thirds of SPRB coal loads transported by Union Pacific move in gondola cars, which avoids the bottom-loss of coal. (*Id.* at 3, RAB Ex.-2.) Gondola cars are designed to be unloaded only from the top; they are open on the top, have enclosed sides and bottoms, and do not have gates along the bottom. (*Id.* at 3.) Since most private gondola cars and all Union Pacific's gondolas used for coal are aluminum, there is no risk of causing leaks. (*Id.* at 4.) Only one-third of Union Pacific's SPRB-originated coal loads move in open hoppers, commonly referred to a "bottom-dump cars." (*Id.* at 3-4.) These cars are open on the top, have fixed sides, and have gates or doors on the bottom of the cars that open to release the coal during unloading. (*Id.* at 3.)

While only one-third of the Union Pacific coal loads can deposit coal due to leaking gates,[6] every loaded coal car traversing the Joint Line and Union Pacific's coal corridor is fully open on the top and can deposit coal from the top. (*Id.* at 4.) Comparing the difference between the amount of coal dust blown off the top of cars compared to the amount of coal dust coming out the bottom, as found in the NCTA committee study, combined with the predominant use of gondolas on Union Pacific's lines "suggests that the bottom-losses account for only 5% of the total coal dust deposited on our track." (*Id.* at 5.)

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[6] With the shift to higher capacity (286,000-pound) coal cars, "steel gondolas were generally replaced by lower-weight aluminum cars." With the switch to aluminum cars, the risk that rust may create holes in the tub of these cars is no longer an issue. (*Id.* at 4.) And because more coal can be loaded into higher capacity aluminum cars, any remaining steel cars tend to be parked first. (*Id.* at 4-5 n.3.)

2. Union Pacific has taken steps to minimize coal loss from the bottom of cars.

Shippers supply nearly 90% of the bottom-dump cars used for SPRB coal un Union Pacific. As car owners, shippers are responsible for maintenance of their railcars. (*Id.* at 5; *see also* UP Op. Glass VS at 9.)[7] But Union Pacific assists its customers in preventing coal leaks from their bottom-dump cars. (*Id.* at 7.) As required by the FRA, Union Pacific inspects all coal cars at origin and destination, conducts an intermediate terminal inspection (commonly called a 1500-mile inspection) on every SPRB train, and conducts additional inspections as required for longer trips. (*Id.* at 6)

Union Pacific's carmen follow detailed inspection checklists, including "looking for leakage and examining outlets and doors for damage" and operability on inbound inspections, as well as checking that the gates and doors are "closed and secure" when leaving the terminal. (*Id.* at 6.) If an inspection reveals that a railcar is defective (such as having an improperly closed gate where excessive coal leaks from the bottom), Union Pacific will "bad-order" the car and hold it for instructions from the car owner for making the necessary repair. (*Id.* at 6-7.)[8]

Although Union Pacific's bottom-dump cars were used in only 3-6% of Union Pacific's SPRB originated carloads during 2007 through 2009 (*id.* at 5, 7), Union Pacific's maintenance practices and improvements of its own fleet have minimized the likelihood of coal loss from the bottom of its own cars. (*Id.* at 5-6.) For example, as part of Union Pacific's program to upgrade 1,508 of its hoppers to a 286,000-pound

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7 The shippers can take steps to reduce coal losses from the bottoms of cars by making sure the gates of their bottom dump cars work properly and close tightly, and repairing or replacing cars with gaps, holes, or improperly fitting gates. (Beck VS at 5-6.)

8 Of course, Union Pacific subjects its cars to the same inspections, but when a defect is discovered the car owner is responsible for the repair. (*Id.* at 7.)

maximum capacity, it checked to confirm that "doors properly fit upon locking and unlocking" and repaired "all holes and openings caused by loose fitting gates." In the last five years, Union Pacific spent $2.4 million for gate repairs on its own fleet of bottom-dump cars. (*Id.* at 8; BNSF Op. VanHook VS at 11.)

Where the bottom-dump car's gates are sound and shut tightly, there should be no substantial leaks of coal from the car bottom. Shippers should and Union Pacific does inspect cars for leaking or defects that cause leaks. Those bad-ordered cars are removed from service. The processes that Union Pacific follows have succeeded so that leaking coal cars are few. (*Id.* at 7.)

C. But Coal Dust Has Rapidly Accumulated in New Track and Recently Cleaned Track

Despite the predominant use of fixed-bottom coal cars on Union Pacific's line, as well as Union Pacific's inspections and maintenance practices that minimize the bottom-loss of coal, Shannon & Wilson confirmed a high rate of coal deposition on Union Pacific lines even hundreds of miles away from the Joint Line. (UP Op. Ev. at 7-8; UP Op. Connell VS at 16-17, Ex. DC-8 & DC-10.) BNSF found that brand new track that BNSF installed on the Joint Line with clean materials "had been contaminated with coal dust in a few months." (BNSF Op. VanHook VS at 14; BNSF Op. Ev. at 13.) BNSF also found that coal dust accumulates rapidly on recently cleaned track. For instance, BNSF replaced ballast all the way down to the concrete structure on a bridge in 2007 and in 2009 found it needed to repeat the entire process because the coal dust had contaminated "at least 12 inches of compacted ballast." (BNSF Op. VanHook VS at 14.)

Given these circumstances and the undeniable fact that large quantities of coal dust are blown off the tops of loaded SPRB coal cars,[9] BNSF's tariff rules reasonably focus on reducing coal dust emissions from the tops of cars.

III. Deferred Maintenance and Defective Track Design Do Not Explain the Failure of the Joint Line in 2005

The issues before the Board in this proceeding involve whether in 2010 and beyond BNSF may establish rules to inhibit coal dust dispersion. Attempts to prove that two derailments five years in the past were caused by defective design or deferred maintenance are irrelevant and misguided. Contrary to AECC's, Coal Shippers' and Associations' contentions,[10] the May 2005 derailments cannot be explained by suggesting that the Joint Line's instability was due to deferred maintenance or improper track construction.

The Joint Line failure was a rapidly-occurring, unexpected, and catastrophic failure over hundreds of track miles. This episode illustrates that unless coal dust emissions are reduced, BNSF and Union Pacific will be forced to continually undercut at between 1/6 to 1/3 of these high density coal lines. (UP Op. Connell VS at 17-18.)

If the Joint Line's track design were indeed flawed or if track maintenance had been deferred, the Joint Line would have experienced more track-related derailments and sooner than the two that occurred in 2005. Moreover, if the Joint Line infrastructure were defective or if its maintenance had been deferred, slow orders would not have declined from 2003 to early 2005 and the Joint Line would have been incapable of

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9 *See* BNSF Op. Ev. at 4.

10 *See* AECC Op. Ev. at 2-3, 6-15; Coal Shippers Op. Ev. at 15-17, App. B, Crowley VS at 15-16; Coal Shippers Op. McDonald VS at 6-8; Associations Init. Com. at 4; *see also* TUCO Op. Statement at 4-5 (questioning whether more frequent maintenance on the Joint Line would have prevented the 2005 Joint Line failures).

sustaining the increasing and record volumes it experienced in 2004 and the first four months of 2005. (BNSF Op. Fox VS at 5; UP Op. Connell VS at 6; UP Op. Connell VS at 6.)

A. Joint Line Failure Was Widespread Catastrophic Failure that Occurred Quickly After Substantial Precipitation and Has Not Been Repeated

The Joint Line failure was unprecedented. Never before had either Union Pacific or BNSF experienced that type of failure in such a short time span. In his verified statement submitted as part of Union Pacific's Opening, Union Pacific's Vice President of Engineering, David Connell, described "[t]he occurrence of back-to-back derailments, accompanied by the sudden appearance of widespread instability throughout the Joint Line," as "shocking." (UP Op. Connell VS at 5.) And BNSF executives have no doubt of the cause that led to the May 2005 derailments. BNSF's Vice President of Transportation, Gregory Fox, and Assistant Vice-President and Chief Engineer-Systems Maintenance and Planning, William VanHook, both concluded that the cause of the derailments, after thorough investigation, was attributable to large amounts of rain and snow and high levels of coal dust. (BNSF Op. Fox VS at 5; BNSF Op. VanHook VS at 3-4.) Numerous slow orders were issued, and it required months of extraordinary maintenance. (UP Op. Connell VS at 7, 10-11; BNSF Op. Ev. at 9; BNSF Op. Fox VS at 4-5.) The disruption to operations caused serious shortfalls of coal deliveries. (*See* UP Op. Connell VS at 10; BNSF Op. Ev. 9-10; BNSP Op. Fox VS at 5.) There has been no type of catastrophic failure on the Powder River coal corridor before or since May 2005.

B. Experience Before and After May 2005 Demonstrates that Substantial and Ongoing Deposits of Coal Dust Is the Problem, Not Deferred Maintenance or Defective Track

While Coal Shippers and AECC claim (along with Ameren who raises the possibility) that the May 2005 derailments were the result of deferred maintenance and/or defective track design, experiences before and after the May 2005 derailments portray a different story. There was no telltale sign of impending track failure leading up to the May 2005 derailments. The Joint Line operated both effectively and efficiently in 2004 and through the first four months of 2005:

- Union Pacific and BNSF accommodated record volumes of coal deliveries in the first quarter of 2005. (BNSF Op. Fox VS at 5; UP Op. Connell VS at 6.)
- Slow orders decreased on the Joint Line throughout 2004. (UP Op. Connell VS at 6.)
- FRA conducted a geometry car inspection on the Joint Line in early May 2005, which confirmed a very low incidence of track defects. (UP Op. Connell VS at 7.)
- There had been no track-related derailments for several years before the May 2005 derailments.[11]

All of these experiences are objective indicators that the Joint Line was operating in a safe and proper manner.

The experiences after the May 2005 derailments equally demonstrate that substantial and ongoing coal dust deposits caused track instability. For example, BNSF

[11] FRA Office of Safety Analysis Safety Data 3.07 (www.fra.dot.gov).

discovered that a new track it had installed became contaminated with coal dust in merely a few months. (BNSF Op. VanHook VS at 14.) And Union Pacific is finding coal dust deposits on its rails, nearly 600 hundred miles beyond the Joint Line. (UP Op. Connell VS at 17.) Union Pacific continues monitoring the deposits through collectors installed along its Powder River, South Morrill and Kearney Subdivisions. These passive collectors have confirmed a high rate of accumulation since October 2009. (*See, e.g.*, Update of Union Pacific Dustfall Collector Network along North Platte Division, Jan. 13, 2010, at UP-AECCBN-0013582 [Counsel Ex. 7].)

The 2005 Joint Line failure cannot be explained by either inadequate maintenance or defective track structure. Both railroads were experiencing record volumes on the Joint Line and reduction in slow orders. Events both before and after the May 2005 derailments—including tests conducted by the FRA—effectively demonstrate that significant and ongoing coal dust deposits were the cause of the May 2005 derailments.

IV. Coal Shippers' Cost/Benefit Analysis Is Incomplete and Flawed

In concluding that continued undercutting is preferable to preventing the accumulation of coal dust on railroad right-of-way,[12] Coal Shippers conducted an

[12] Coal Shippers, TUCO and Ameren suggest that BNSF's emission standards are unnecessary because railroads have transported coal in open-top cars for more than 100 years and because of "longstanding" and "traditional" railroad maintenance procedures. (Coal Shippers Op. Ev. at 14-15; Ameren Op. Ev. at 5; TUCO Op. St. at 4.) But imposing a requirement that has not previously been implemented is not unreasonable. For example, in *North American Freight Car*, the complainants argued that charging for storage of empty cars was unreasonable, in part because BNSF had not historically charged for holding empty private cars, but the Board rejected that argument. In doing so, the Board inferred that current railroad conditions may override common past practices. *N. Am. Freight Car Ass'n v. BNSF Ry. Co.*, STB Docket No. 42060 (Sub-No. 1), at *12-*17 (Jan. 24, 2007) ("even if holding cars . . . was a common practice in the past, that does not mean that it is unlawful for carriers to try to move them more quickly under today's conditions"). Similarly, due to operational, volume, traffic, track and other changes affecting coal rail transportation in recent years, today's conditions justify that shippers engage in coal dust mitigation efforts.

incomplete cost/benefit analysis comparing claimed shipper costs of surfactant spraying with their own calculation of BNSF's cost of removing coal dust. The cost-benefit calculations prepared by Mr. Thomas Crowley on behalf of Coal Shippers contain the following high-level defects: {[redacted]; (3) fails to evaluate coal dust's impact on non-coal customers; and (4) does not acknowledge benefits to shippers of receiving all of the coal that they purchased and improving utilization of their fleet cars. (*See generally* Glass Reply VS at 2-7.)

A. Coal Shippers Compare the Costs of Spraying {[redacted]} Against Cost Savings of Only the Joint Line and Adjacent BNSF Track

As Union Pacific explained in its Opening Argument and Evidence, BNSF's tariff rules at issue in this proceeding do not apply to Union Pacific's customers. (UP Op. Ev. at 17-20.) This point is not disputed by BNSF. (*See* BNSF Op. Ev. at 26 (stating its tariff rules do not apply to Union Pacific customers).) Therefore, it is inappropriate for Mr. Crowley to include the cost of spraying {[redacted]

[redacted] (Glass Reply VS at 5.) Mr. Crowley ignored relevant information known to Coal Shippers who are Union Pacific customers showing that "disturbing amounts of coal dust" have been found on Union Pacific's coal corridor hundreds of miles beyond the Joint Line. (*Id.* at 5; *see generally* UP Op. Ev. at 7-8.) [redacted]

B. Coal Shippers Did Not Evaluate Coal Dust's Impact on Non-Coal Customers

Mr. Crowley incorrectly assumes that the only relevant parties in his cost/benefit analysis are coal shippers and BNSF. He ignores the impact that coal shippers' coal dust emissions have on safe, reliable, and efficient rail transportation service to other Union Pacific customers who ship commodities other than coal. SPRB coal movement on Union Pacific "share[s] a Y-shaped corridor from O'Fallons, Nebraska through Gibbons to Menoken Jct., Kansas and to Fremont, Nebraska" with hundreds if not thousands of other non-coal customers. (Glass Reply VS at 6.) For example, the segment between North Platte and Gibbons averaged 140 trains daily in 2007, with an average of 65 daily non-coal trains. Some of those non-coal trains transported time sensitive intermodal traffic. (*Id.*) Hundreds of Union Pacific's non-coal customers with daily traffic over the Overland Route in Nebraska will enjoy more reliable service if less coal dust is deposited on the track. Likewise, those same non-coal customers will have their service and equipment utilization "deteriorate if Union Pacific must undercut 265 miles of track year-

in and year-out in order to keep up with coal dust being deposited by the daily 35 to 37 loaded coal trains." (Glass Reply VS at 6-7.)

C. Coal Shippers Ignore the Benefits They Will Receive from Reduced Coal Dust Emissions

The implementation of coal dust emission preventative measures by shippers will be a win-win situation for everyone. Smaller amounts of coal dust depositing on the railroad's right-of-way will result in more efficient and reliable rail transportation. Increased railroad efficiency and reliability means that more commodities and products (including coal) can be transported for all customers.

Similarly, because less coal will be blowing off of coal cars, shippers receive a direct and immediate benefit from keeping their coal in the railcars: more of the coal they have paid for will reach its final destination. (Glass Reply VS at 7.) For example, if 225 pounds of coal per car are lost during transportation from origination in the SPRB, shippers "have lost a ton of coal for every 9 cars." (*Id.* at 7.) Additionally, shippers' car utilization rates are reduced as a result of the "increased maintenance curfews for undercutting, switch-cleaning and replacement." (*Id.*) While these cost-savings to shippers do not equal the cost of spraying, they must nevertheless be factored into the cost-benefit analysis prepared by Mr. Crowley.

V. Union Pacific Has Not Recovered its Coal Dust Maintenance Costs from Shippers

Some shippers conclude that they have already paid for coal dust removal costs through the rates they are charged.[13] They then use that conclusion as a rationale for why

[13] Although this is a proceeding challenging the reasonableness of BNSF coal dust tariff rules that do not apply to Union Pacific, Ameren's {([redacted]} and others' comments on railroad rate-setting generally require Union Pacific to respond to shipper claims to the extent they include Union Pacific's coal rates. (*See, e.g.,* Ameren

they should not pay for any coal dust prevention measures, claiming they would in effect be double charged for coal dust costs. (*See* Coal Shippers Op. Crowley VS at 2.) But their underlying assumption is not true, at least with respect to Union Pacific, because its {[redacted]}

Union Pacific's rates are set based on market conditions and are influenced by a variety of factors. (Glass Reply VS at 9.) While Union Pacific considers {[redacted]} (*Id.* at 9-10.)[14] {[redacted]} (*Id.* at 9.)

If the Board does not find BNSF's tariff rules unreasonable, Coal Shippers and other shippers request that the Board direct BNSF and Union Pacific, if applicable, to pay

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Op. Evid. at 8 ("Track maintenance expenses, such as undercutting, have traditionally been included in railroad costs when establishing rates"); Associations Init. Com. at 5 ("Coal shippers already pay for maintenance of rail lines, includes ballast and sub-ballast in their rates); *cf.* Coal Shippers Op. Crowley VS at 2 ("[I]n setting rail rates to transport PRB coal, the railroads [including Union Pacific] have included the costs associated with the treatment of coal dust through traditional maintenance practices.").)

14 A railroad does not recover all of its costs unless it recovers all of its operating expenses and "earns an economic profit that is a return on investment equal to its cost of capital." (*Id.* at 10.) The Board has consistently found that Union Pacific has not earned its cost of capital through 2008, and Union Pacific is "almost certain" that it will not earn its cost of capital for 2009. (*Id.*)

shippers an allowance for their costs incurred in connection with complying with the rules. (Coal Shippers Op. Arg. at 50-52.) The Board should deny their request for three reasons. First, as shown above, {[redacted]} Second, the Board will handicap Union Pacific in working collaboratively with shippers to develop other preventative measures if it rules that shippers do not have to pay for coal dust-related costs. All stakeholders should be incentivized to develop the lowest cost approach. Third, shippers have always been responsible for tendering their loads and cars that they supply in a manner suitable for safe transportation of the car and its contents. It would be inequitable and contrary to the public interest in safe transportation to declare that for SPRB coal they are an exception and to place the burden solely on the shoulders of the railroads.

VI. Ameren's Request for an STB Order Directing How Railroads May Change Rates Should Be Rejected

Ameren argues that BNSF's tariff, if implemented, would inappropriately shift maintenance costs from railroads to shippers and also result in increased rates paid by shippers.[15] (Ameren Op. Ev. at 8-9.) As a result, it specifically requests that the Board's decision "state that railroads may not use the coal dust issue as an improper way to raise rates." (emphasis added) (*Id.* at 9.) Ameren's request rests on a number of assumptions that this reply has demonstrated are mistaken and that we will not repeat here. The Ameren request that the Board should dictate to railroads that their future rates cannot be

15 {[redacted]} (Glass Reply VS at 8-9 n. 6.)

set to recover the costs associated with coal dust is ill-conceived as a matter of law for several reasons.

First, most SPRB coal on Union Pacific moves under contract rates. (*See* Glass Reply VS at 9.) The Board has no jurisdiction over such rates. *See* 49 U.S.C. § 10709(c)(1).

Second, even when Union Pacific customers ship under common carrier rates, then the question of what costs should be included in the rates are governed by rate reasonableness standards in § 10704 and not as an unreasonable practice under § 10702. Shippers may not use the Board's unreasonable practices jurisdiction to challenge the reasonableness of a rate. *See Union Pacific v. Interstate Commerce Commission*, 867 F.2d 646 (D.C. Cir. 1989).

Finally, rates, and in particular Union Pacific rates, are beyond the scope of notice established in this proceeding. The Board's December 1, 2009 Order instituting a declaratory order proceeding identified three issues to be addressed: whether BNSF's tariff provisions constitute an unreasonable rule or practice; whether BNSF may establish rules designed to prevent coal dust emissions from coal trains operating over its lines; and whether BNSF actions to enforce compliance with those tariff provisions would violate BNSF's common carrier obligation. *Arkansas Elec. Coop. Corp.—Petition for Declaratory Order*, STB Docket No. 35305 (STB Decision served Dec. 1, 2009) at 1. The Board's Order does not discuss or even reference rates.

VII. Whether BNSF's Tariff Rules Are Reasonable Is Not Within the Primary Jurisdiction of the FRA

According to the Associations, the FRA should determine whether safety-related obligations imposed on shippers are reasonable. (Associations Init. Com. at 6.)

Essentially, they claim that the issues presently before the Board are within the primary jurisdiction of FRA. Specifically, the Associations assert that the FRA should, inter alia, determine whether BNSF's emission limits would prevent derailments; whether more coal dust comes from the bottom of the cars than the top; whether the railroads apply emission limits to themselves; whether spraying reduces coal dust emissions; and whether maintenance is more cost-effective than spraying. (*Id.* at 7-8.) We have addressed elsewhere in our reply how the Associations' assumptions underlying many of its questions or claims are mistaken and we will not repeat those points here. Instead, we direct our attention to why we believe that the FRA does preempt STB review of the BNSF rules.

As an initial matter, the FRA does not need to decide whether BNSF's tariff rules are reasonable because the railroads are already operating safely pursuant to FRA regulations. Indeed, the FRA contemplates that its track rules are minimum requirements. Railroads are expressly authorized to adopt and enforce more stringent rules when not inconsistent with the FRA rules. 49 CFR 213.1(a). BNSF's tariff rules at issue in this proceeding are preventative rules that will mitigate a risk to continued safe operations. But no party of record argues that the railroads are operating unsafely. And Associations' Initial Comments cite no inconsistency; they raise only questions, questions the Board can address.

The factual issues raised by the Associations touch upon safety, service, and commercial issues between a rail carrier and its shippers. The Board's mission embraces all of these objectives: safety, reliability and efficiency. *See Study of ICC Regulatory Responsibilities*, 1994 WL 639996, at *20 (Oct. 25, 1994) (Commission must reconcile

many factors, including safety, when determining whether a carrier's practice is reasonable). And in discharging its duties, the Board looks to the National Transportation Policy. That policy commends safety for the Board to foster at least three different times. *See* 49 U.S.C. § 10101 (3) (promote safe and efficient rail system); (8) (operate transportation facilities and equipment without detriment to public health and safety); and (11) (encourage fair wages and safe and reliable working conditions).

Further, the Board has previously concluded that safety issues do not divest it of jurisdiction. In a case involving whether a purchaser of a rail line was entitled to receive any portion of a fund that had been set aside to pay for damage to the line that occurred while the purchaser owned the line, the Board concluded that the purchaser was not entitled to any refund because repairs to eight crossing signals had been necessary. *Railroad Ventures, Inc.—Abandonment Exemption—Between Youngstown, OH, and Darlington, PA*, STB Docket AB-556 (Sub-No. 2X) (April 28, 2008) at 3-4. The purchaser argued that this decision "trespasse[d] upon the primary jurisdiction of the Federal Railroad Administration," but the Board disagreed, holding that (1) the fact that FRA safety regulations were relevant in determining that the purchaser disregarded its common-carrier obligation but did not divest the Board of authority, and (2) it was unnecessary to refer any issues to FRA where the Board was not faced with technical questions. *Id.* at 8-9. Similarly, the First Circuit has held that the Board need not refer a matter to FRA where "the STB simply had to determine whether, on the record, Guilford had good reasons to be concerned about safety and whether its responses were reasonable." *Granite State Concrete Co. v. STB*, 417 F.3d 85, 95 (1st Cir. 2005).

Here, the Associations have not identified any safety regulations that would be impacted by BNSF's tariff, and there are no technical questions before the Board that are within the special expertise of FRA. The question is simply whether AECC or other opponents of the BNSF tariff rules have established through "competent evidence" that the coal-dust emission provision in BNSF's tariff is "unjust and unreasonable." *N. Am. Freight Car Ass'n v. BNSF Ry. Co.*, STB Docket No. 42060 (Sub-No. 1), at *10-*11 (Jan. 24, 2007). *See also* 49 U.S.C. § 10501(b) (Board's jurisdiction over "remedies provided in this part with respect to...practices...is exclusive."); *Granite State*, 417 F.3d at 95 (holding that referral to FRA was unnecessary where STB simply had to determine whether railroad's decision to impose restrictions on another railroad were reasonable).

CONCLUSION

The shippers' and associations' arguments challenging the reasonableness of BNSF's tariff rules are misplaced and rest on incorrect assumptions. As Union Pacific discussed in detail in its Opening, the Board should permit railroads to adopt reasonable rules to keep shippers' coal in the railcars, which would prevent coal dust emissions from railcars and the subsequent deposition on railroad right-of-way. Such a ruling would promote safe, efficient and reliable rail transportation.

Dated: April 30, 2010

Respectfully submitted,

By: /s/ Joe Rebein
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Counsel Exhibit No. 5

REDACTED

Counsel Exhibit No. 6

REDACTED

Counsel Exhibit No. 7

REDACTED

VERIFIED STATEMENT OF DEXTER N. MCCULLOCH

My name is Dexter N. McCulloch. I am a Senior Vice President and Director of Railroad Services for Shannon & Wilson, Inc., a geotechnical and environmental engineering company. I am a licensed engineering geologist. I have been with Shannon & Wilson for 37 years and for the past 27 years I have been working almost exclusively on railroad maintenance, design and construction projects. My clients include Union Pacific Railroad Company, BNSF Railway, CSXT, and Norfolk Southern railroads plus several short line or regional railroad companies like Rail America, Omnitrax, the Alaska Railroad Corporation, and the Wheeling and Lake Erie. My CV is attached as an appendix to my statement. (DNM-App. 1)

I submit this statement in support of Union Pacific's Reply Evidence and Argument in this matter. I was asked to comment on assertions that were advanced by various shippers and associations in this proceeding that downplay the harmful aspects of coal dust. For example, I will address why their statements that portray coal dust in the same light as other foulants ("one of at least *six* recognized rail ballast contaminants") (*See, e.g.,* Coal Shippers Op. Ev. at 20) and their statements that infer coal dust is not harmful when it makes up a minority percentage of waste material contaminant {[redacted]} (*Id.* at 21, 22), are inconsistent with my experience. As I will explain in more detail below, by categorizing coal dust similarly with historical foulants and by addressing the impact of coal dust by weight as opposed to volume,

certain shippers and associations significantly understated the serious risks and dangerous impact that even a small amount of coal dust can and does have on the ballast.

Specifically, I will address our firm's research into the unique properties of coal dust and its impact on railroad maintenance of ballast. Based upon our research, we have concluded that coal dust must be measured according to its contribution to the volume of the fouling particles and not based solely on its weight. This is significant because far less coal dust by weight is required to completely foul ballast, compared to other fouling materials. By way of example, as little as 15% coal dust by weight is sufficient to completely fill the ballast void spaces leading to fouling. As a consequence, and unlike other historically known contaminants, such as sand, we have concluded that more frequent undercutting and shoulder cleaning is required to address coal dust fouling in ballast. Generally, heavy haul railroads might expect a cycle of ballast undercutting every 10 to 12 years. When this same track is exposed to coal dust, that cycle is shortened by a factor of two to three, depending on the track's proximity to the mines. As one might expect, the frequency increases as one moves closer to the mines. In certain locations where dynamic loading may increase, such as near switches or bridge ends (where coal dust can be very prevalent), the frequency of the need for undercutting is often shortened even further.

Over the course of my career, I have been involved in many ballast quality and maintenance evaluations. For the past three years, I have been the principal investigator for a project on Union Pacific coal lines east of the Powder River Basin

designed to evaluate the impact of coal dust on ballast quality. Our firm's reports to Union Pacific are summarized in the Verified Statement of David Connell and were submitted as exhibits to his statement,[1] which was previously filed with the Board on March 16, 2010.

The Role of Clean Ballast and Sources of Fouling:

Railroad ballast along the Joint Line and on Union Pacific's coal lines consists of coarse granite aggregate placed under and between the crossties. The ballast rests on a layer of finer grained aggregate known as sub-ballast. These two layers in turn rest on a prepared sub-grade generally constructed from compacted local soil. The particles in newly installed ballast are nearly uniform in size. The angular particles of granite in new ballast make contact and interlock with each other at many points leading to layer stability. This stability allows the ballast to support and distribute heavy loads from passing trains and maintain proper track geometry.

Granite ballast in this configuration contains approximately 45% voids by volume when it is first placed in service.[2] These air voids exist due to the sharp angles with which the granite particles make contact in the bed. Voids in ballast are critical to maintaining the shear strength of the ballast in that it allows continual contact between aggregate particles under load. Importantly, these voids allow rainwater to drain freely to the shoulders of the track.

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[1] Exhibits DC-8 and DC-10, respectively, to VS of David Connell, submitted in support of Union Pacific's Op. Ev.

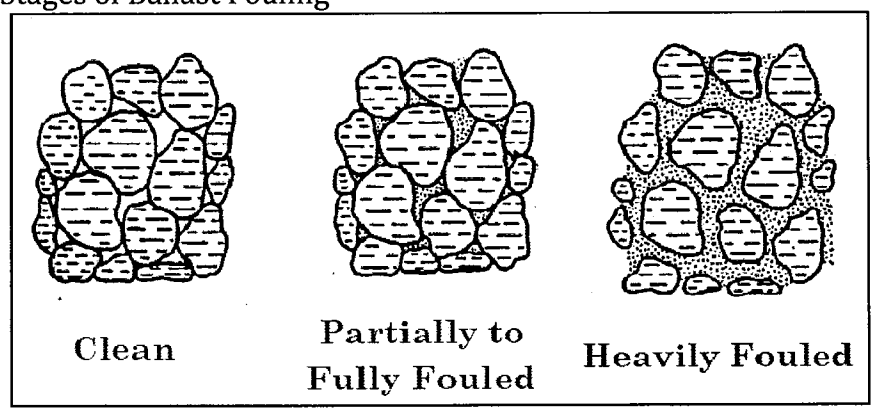
[2] Selig, ET and Waters, 1994, Track Geotechnology and Substructure Management, Thomas Telford Publications, London.

As ballast ages, finer particles from several sources fill these air voids and cause ballast fouling. Normally, the ballast contaminants on a coal route include a mixture of fines from ballast and concrete or wood tie breakdown, plus small amounts of wind-blown sand, traction sand, etc., in addition to coal dust. These finer particles tend to migrate down into the ballast section and fill the voids. It is this process that can lead to ballast fouling. In my experience, coal dust represents a very significant source of ballast fouling on the Union Pacific coal routes leading away from the Joint Line.

Adverse Effects from Ballast Fouling:

When sufficient fines accumulate in a ballast section and as a result, begin impairing drainage, the track structure is weakened and track movements under train loading increase. This process begins to occur before all of the voids are filled because the fines tend to work their way downward. The up and down movement of the tie accelerates abrasion of the tie and surrounding ballast. So the fines that are generated form a muddy slurry around the tie and create a trap for rainfall and snowmelt. The pumping action under train passage then results in a tie surrounded not by ballast, but by water and slurry. In addition to this water-slurry mess, the aggregate components of the ballast then fail to make good contact, and as a result, the aggregate components lose their interlock with adjacent particles. In sum, when this occurs, the structural rigidity of the ballast is limited to the strength properties of the fouling materials. Under these conditions, the track components and track geometry deteriorate very quickly.

Figure 1. Stages of Ballast Fouling[3]



Calculating the Degree of Ballast Fouling:

Until recently, the Selig and Waters Ballast Fouling Index ("Selig and Waters Index") was used as a technique to test and quantify the extent of ballast fouling. Under the Selig and Waters Index, fouling is calculated as a percentage by weight of material less than 4.75 millimeters in diameter in a ballast sample. Ballast is considered fouled when between 20 to <40 percent by weight of a ballast sample is fines. Greater than 40 percent by weight is considered highly fouled [Table 1].

[3] Tutumluer, E., Laboratory Characterization of Coal Dust Fouled Ballast Behavior. Published by AR060 Railway Maintenance Committee Journal of Transportation Research Record, March 15, 2009. Attached as Exhibit DC-1 to VS of David Connell in support of Union Pacific's Op. Ev.

Table 1 Fouling Index, from Selig and Waters, 1994

Table 7.2 Fouling Index	
Category	F_I
Clean	<1
Moderately clean	1 to <10
Moderately fouled	10 to <20
Fouled	20 to <40
Highly fouled	≥ 40

Because the Selig and Waters Index calculates by weight, not volume, it is underreporting fouling from less dense materials, such as coal dust. This conclusion is based on our recent studies of coal dust in railroad ballast. For example, if 15-20% of ballast weight is from coal dust contaminants, this percentage is sufficient to completely fill the 45% volume of air void normally present in clean ballast. Thus, using the Selig and Waters Index to compare traditional foulants with coal dust seriously underestimates the risk that coal dust represents as a fouling agent. As a result, we have determined that contrary to the shippers and associations' assertions, coal dust does not have to be the dominant contaminant—or even among the top three in terms of percentages—to represent a very serious contaminant of ballast.[4]

[4] Coal dust also differs significantly from other types of ballast contaminants. Dr. Tutumluer has identified physical properties of coal dust that make it particularly risky to ballast stability, such as its water absorption and impact on shear strength. Tutumluer E., Laboratory Characterization of Coal Dust Fouled Ballast Behavior, attached as Ex. DC-1 to VS of David Connell in support of Union Pacific's Op. Ev.

Coal dust has less than half the bulk specific gravity[5] of fines generated from ballast or concrete tie breakdown [Table 2]. Bulk specific gravity differs from particle specific gravity in that it includes the air spaces between particles in the mix. Since fine aggregates also have air voids between particles, their bulk specific gravity is much lower than the specific gravity measured for the solid components. The data from Table 2 represents industry standard values for bulk density and specific gravity of coal. Bituminous and Sub-Bituminous coal are essentially the same in this respect.

Table 2. Bulk Specific Gravity of Common Ballast Fouling Materials

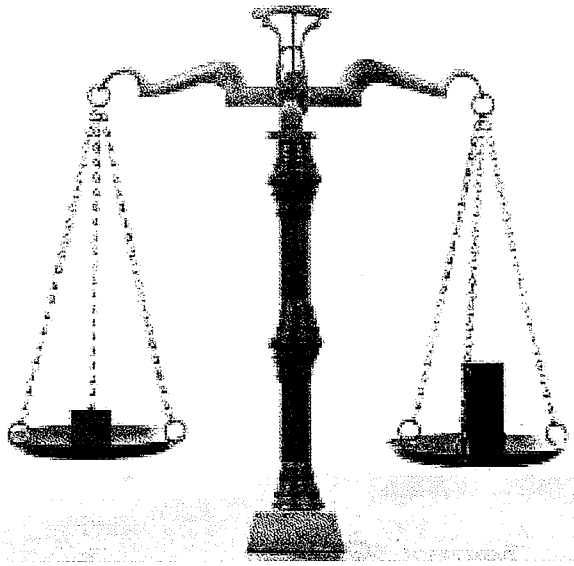
Material	Specific Gravity	Lbs / Ft^3
Bituminous Coal, Broken	0.83	52
Bituminous Coal Dust	0.56	35
Granite, Broken	1.65	103
Clay Particles	1.8	112
Sand Particles	1.6	99

From: http://www.powderandbulk.com/resources/bulk_density/material_bulk_density_chart_c.htm

Picture a small sectional sample of ballast that contains one cubic foot of void air space. Such a sample would take an equal volume, one cubic foot of ballast fines, or one cubic foot of coal dust, to completely fill those voids. But because coal dust is far less dense (by a factor ranging from two to three) and has a lower bulk specific gravity, a cubic foot of coal dust weighs less than half as much as a cubic foot of granite fines. To put it more simply, a pound of coal fines occupies more than double the volume, than a pound of granite fines. [Figure 2] So an equal percentage by

[5] "Specific gravity" is the ratio of the density (mass per unit volume) of a substance to the density of a given reference material, usually water. A specific gravity less than 1 indicates the substance is less dense than water.

weight of coal fines would fill more than double the ballast void space compared with granite, clay or sand fines.



1 lb Granite Fines 1 lb Coal Fines

Under the current Selig and Waters Index testing regimen, ballast fines or concrete tie fine fouling materials would reach the threshold measurement of 20 to <40% of a ballast sample long before coal dust does. Thus, under the Selig and Waters Index, a sample of ballast completely fouled by coal dust alone would appear to have less than half the Ballast Fouling Index of a ballast sample completely fouled with only granite or concrete tie fines.

Unlike other types of fines, because of the unique characteristics of coal dust, coal dust fouling of ballast must be calculated in terms of volume, not weight. Ballast contaminated by only coal dust fills all of the voids and the granite stone loses all interlock with as little as 15%-20% of coal dust by weight. To accurately describe the extent of fouling, the relative volumes of the rock-derived materials compared to coal dust must be determined. The method that we have developed

and use involves separating the fines from the ballast sample, drying them, weighing them, burning off the coal in a high temperature oven, and applying a correction for ash content in the coal residue. Once the weight of the coal in the sample is obtained, we can then calculate the coal volume using a bulk specific gravity correction.

Factors that Affect the Rate of Ballast Fouling:

Ballast fouling is an eventuality on all heavy haul routes. The rate of ballast fouling even on routes that do not carry coal is dependent on several factors. The most important factors are hardness and durability of the ballast particles, the traffic volume, and weather conditions. Defects in the track geometry or rail surface profile can also impact track dynamic loading, which leads to accelerated ballast breakdown and rapid fouling.

But the rate at which ballast becomes fouled on a coal line is greatly accelerated by the coal dust. Certain geographic conditions and track orientation with respect to prevailing winds can cause some locations to be more severely impacted than others. Because of in-train dynamic forces, track switches or bridge ends are often locations where coal dust accumulates most quickly. Regardless of these factors, the impact of coal dust is greater in proximity to the mines (as on the BNSF-UP Joint Line) and decreases with distance from the loading points. I also reviewed documents related to the {[redacted]}[6] This factor

[6] *See, e.g.,* Coal Shippers' Op. Ev., McDonald VS at 6, fn 2.

decreases with distance from the mines but not as much as one might expect. The factor decreases to about two as one travels further from the mines.[7] Still, coal contributes to accelerated ballast fouling hundreds of miles from the mines.

Conclusion:

The rate at which ballast becomes fouled to the extent that undercutting is required is greatly accelerated by the presence of coal dust. While many researchers have studied ballast fouling, very little research has been done until the past few years on the impact of coal dust on a heavy haul coal line. I have reviewed the verified statements of Messrs. Douglas G. DeBerg and Richard H. McDonald and acknowledge and respect their respective time spent working for railroads, but in their statements, both relied on their railroad experiences and refrained from referring to any new research. I firmly believe that the evolving research and scientific studies associated with coal dust conducted just in the past few years mean that we can no longer rely solely on our past experiences. We must supplement our experiences with updated scientific research.

Due to the unique properties of coal dust, we have determined that historical tests used to quantify the extent of ballast fouling greatly understate the contamination that coal dust represents in the ballast. Because coal dust as a foulant is far less dense than the other known contaminants, the shippers—like these historical tests—have been looking to the wrong measurement. Ballast

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[7] Shannon & Wilson, Inc., 2010. Union Pacific Railroad Ballast Study, North Platte Division: Shannon & Wilson, Inc., Seattle, Washington. January, 2010. *See also* Exhibit DC-10, to VS of David Connell, submitted in support of Union Pacific's Op. Ev.

fouling caused by coal dust should be measured by volume and not by weight. The increases in the rate of fouling due to coal dust were not anticipated but these results have led to a need for doubling or tripling the maintenance efforts in order to maintain a stable and safe track structure. As indicated in our studies, the undercutting necessary to address coal dust in ballast is now on a cycle of approximately every three to six years as opposed to the standard 10 to 12 years for heavy haul routes that are not exposed to coal dust.

VERIFICATION

I, Dexter N. McCulloch of Shannon & Wilson, Inc., declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed on this 28th day of April, 2010.

Dexter N. McCulloch

DNM – Appendix 1

Dex McCulloch, LEG | Senior Vice President

EDUCATION
BS / 1968 / Geology

REGISTRATION
1978 / Certified Engineering Geologist / OR
2001 / Licensed Engineering Geologist/ WA

Member AREMA

For over 37 years, Dex has been involved in a wide range of railroad projects across the United States. He has participated and managed the geotechnical aspects of new track construction for most major railroads including the BNSF; Conrail; Dakota Minnesota and Eastern Railroad; Denver & Rio Grande Western; Southern Pacific Lines; and the Union Pacific Railroad. His depth of railroad experience includes new line design and construction, line upgrades, embankment stabilization, landslide prevention and control, rock slope stability, track structure and tunnel construction and rehabilitation, tunnel enlargement, ballast quality and ballast economics evaluations, and bridge foundation design.

Dex has developed several innovative tools and solutions to common railroad problems. His work in embankment stabilization has focused on cost effective drainage solutions that have been adopted by the UPRR, BNSF, and other railroads. He developed a system for risk evaluation of rock fall designed to allow prioritization of rock slopes for repair that has been adopted by BNSF and UPRR. This system takes into consideration use and traffic on the rail line in addition to the physical aspects of individual rock slopes. He also designed an alarm system to warn of track or bridge settlement or landslide movement. The system can detect as little as one-half inch of settlement and is very robust. The alarms have been installed at about 30 problem locations in the US and have been credited with prevention of more than one serious derailment.

Recently he was a contributing author to the "Guidelines To Best Practices For Heavy Haul Railway Operations- Infrastructure Construction and Maintenance Issues", book published by the International Heavy Haul Association. He has also presented several papers at AREA and AREMA.

RELEVANT PROJECT EXPERIENCE

Wheeling & Lake Erie Railroad Landslide Remediation, Various Locations, PA, OH. Principal-in-Charge for geotechnical recommendations to improve the stability of 6 different landslides along the alignment. These landslides are currently effecting track structure and railroad operations. Currently, S&W is providing recommendations for stability improvement of the landslides. For the next phase of the project, we will provide project oversight and construction observation for the proposed stability improvements

BNSF Springfield Division , Principal-in-Charge. Performed a subgrade evaluation of over 1,000 miles of main line track. The project involved evaluation of problem areas including river erosion, fouled ballast, embankment failures, culverts, landslides, and sinkholes.

BNSF, Abo Canyon Track Alignment, Central New Mexico. Dex is principal-in-charge for three line change projects for BNSF including an additional track alignment through the Abo Canyon.

MOTSU, North Carolina. Principal-in-Charge for geotechnical services related to 25 mile long

military railroad serving ammunition port. The project involved remediation of sinkholes in karstic limestone and embankment failures.

Northwestern Pacific (NWP) Railroad Restoration, Northern California, The 300 mile NWP Railroad was damaged by severe storms and flooding and has been closed since 1998. As part of the restoration planning effort, Dex was principal-in-charge of our work. He also performed geotechnical field assessments of the entire line and provided recommendations and cost estimates to improve stability at over 260 landslide and erosion locations. Dex performed condition assessments of 30 tunnels on the alignment, and assisted in developing tunnel rehabilitation recommendations, including repair of two collapsed tunnels.

Dakota, Minnesota & Eastern Railroad (DM&E) Powder River Basin Expansion Project, Powder River Basin Consortium. Dex is principal-in-charge of the geotechnical aspects of the construction of the DM&E Railroad's 590- mile rehabilitation and 280-mile build-out into the Powder River Basin in Wyoming.

Union Pacific Railroad, Relocation Project, Bonneville Dam, OR. As Project Geologist, Dex assisted the Union Pacific Railroad in relocation design, design to control soil stability, design and support of systems for high retaining walls, and instrumentation.

Union Pacific Railroad, Cameo Landslide, Colorado. Dex was Project Manager for the stabilization of this large slide on the Colorado River near Grand Junction , CO. The project involved removal of about 350,000 cubic yards of material from the head of the slide and drainage improvements.

Landslide Repair, Feather River, CA. Principal–In-Charger. Dex was responsible for design options to resolve sliding and loss of ground below the Union Pacific Railroad's main line through the Feather River Canyon in northern California. This was a 15 million dollar project after severe flooding in 1998..

Southern Pacific Railroad, Tunnel No. 23 Bypass and Line Change, Oakridge, OR. As Project Manager, Dex was responsible for providing design recommendations for the Southern Pacific Railroad's Tunnel No. 23 Bypass and Line change, which involved moving approximately 300,000 cubic yards of earth.

Union Pacific Railroad (UPRR), Tunnel #3 Landslide, Tehachapi Mountains, CA. Dex was Principal-in Charge, and was responsible for providing overall guidance in design and remedial construction at this large landslide on the Union Pacific.

Union Pacific Railroad (UPRR), Bonners Ferry Landslide, Idaho. Dex was Principal-in Charge, and was responsible for providing overall guidance in design and remedial construction at this large landslide on the Union Pacific.

Union Pacific Railroad (UPRR), Frazer Landslide, Oregon. Dex was Principal-in Charge, and was responsible for providing overall guidance in design and remedial construction at this large landslide on the Union Pacific.

USDOE Yucca Mountain Rail Access. Dex was Principal-in Charge of the geotechnical aspects of design of a 320-mile long new railroad to serve the Yucca Mountain Nuclear Waste Facility in southern Nevada.

REPLY VERIFIED STATEMENT OF
REX A. BECK

Introduction

My name is Rex A. Beck and I am the General Manager-Freight Car in the Mechanical Department of Union Pacific Railroad Company ("Union Pacific"). I have held this position since June 2008. I began my career with Union Pacific in 1980 as a draftsman, and since then have worked in various engineering positions in the Mechanical Department. I have a Bachelors degree in Engineering from the University of Nebraska and a Masters in Business from Washington University in St. Louis.

I am submitting my statement in response to certain questions and assertions raised in the shippers' opening submissions related to the relative loss of coal from the bottom versus from the top of coal cars. In their opening comments, the shippers question the efficacy of the BNSF coal dust mitigation rules because those rules are directed at reducing emissions from the top of loaded coal cars rather than reducing losses from the bottom.[1] The shippers' comments also suggest that the railroads bear responsibility for the loss of coal from the bottom of cars.[2] My statement addresses the errors in both of these premises.

I begin by describing the National Coal Transportation Association ("NCTA") committee studies conducted in 2005-2006 that concluded that significantly more coal dust escapes from the top than from the bottom of coal cars. Next, I discuss how the cars used to move SPRB coal over Union Pacific lines are already inspected and maintained so as to minimize the possibility of coal falling out of the bottom. Finally, I

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1 Coal Shippers' Op. Ev. at 23-24.
2 *Id.*

describe how Union Pacific, through its inspection and maintenance practices on its own cars, already has minimized the amount of coal loss from the bottom of its railcars.

Joint Shipper-Railroad Tests Demonstrated that Coal Dust Losses are Much Greater from the Top of Railcars than from the Bottom

In 2005, Union Pacific and BNSF, along with the NCTA and its members, formed a task force to study coal dust emissions and evaluate various methods to reduce those emissions. The group's ultimate goal was to better understand coal dust emissions, and everyone involved believed a collaborative approach involving all of the major stakeholders in PRB coal—utilities, coal producers, and the railroads—would produce more and better information and result in the best dissemination of that information. The group formed three committees to study the potential for reduction in coal dust emissions in three distinct areas: Loading Profile, Spray Effectiveness, and Car Quality Standards.[3]

Over the course of this study, the various committees conducted many tests. After several months and rounds of testing, the group reconvened and distributed the results of the NCTA committees' efforts. The results of tests and analysis performed by the Car Quality Standards Committee confirm that significantly more coal was being lost from the top of loaded coal cars than through the bottom. (Coal Dust Mitigation Effort (May 2005-September 2006), NCTA Workshop, September 11, 2006, Ex. RAB-1 at BNSF_COALDUST_0034898). The Car Quality Committee summary highlighted a significant difference between the coal losses by weight from the top of a railcar compared to the losses from the bottom. Specifically, an untreated railcar lost 225 pounds of coal from the top and only 38 pounds from the bottom of a bottom-dump car.

[3] Steve Slobidsky was Union Pacific's representative on NCTA's Car Quality Standards committee. Mr. Slobidsky directly reported to me throughout the NCTA committee studies and is now retired from Union Pacific.

Id. Different tests showed a range of losses from the top of a railcar treated with surfactant, but they were still all greater than the 38 pounds lost from the bottom. *Id.* Thus, the NCTA committee studies confirm that coal dust losses from the top of railcars are significantly greater than those from the bottom.

The studies also support another conclusion -- that coal loss from the bottom of the cars is mainly attributed to open hoppers (also known as bottom-dump cars), which comprise one-third of the coal loads moved by Union Pacific. *Compare id.* at 34887, 34894. Thus, loss of coal from the bottom of cars is further limited by the predominant use of gondolas rather than bottom-dump cars to move SPRB coal over Union Pacific lines. Two-thirds of SPRB coal loads on Union Pacific lines move in gondola cars. (Ex. RAB-2) Gondola cars are open on the top with enclosed sides and bottoms. All gondolas are equipped with rotary couplers so that the car can be turned upside-down for unloading. Because the gondola is designed to unload only from the top, it does not have gates along its bottom. The remaining one-third of the SPRB loads on Union Pacific lines move in open-top hoppers ("hoppers") also known as "bottom-dump" cars. As the name implies, these cars have an open top with fixed sides but are equipped with gates or doors in the bottom of the cars. When unloading, the gates open to release the coal into an unloading pit.[4] Photos of the two types of cars are shown below.

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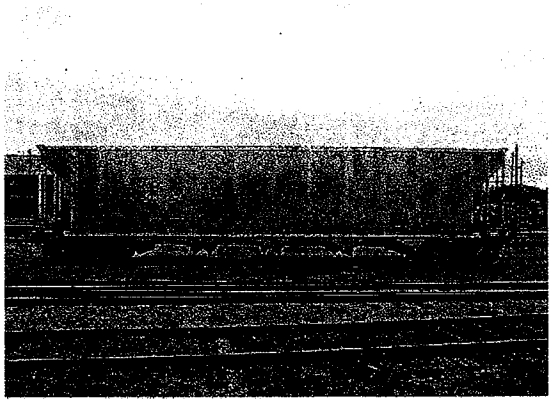
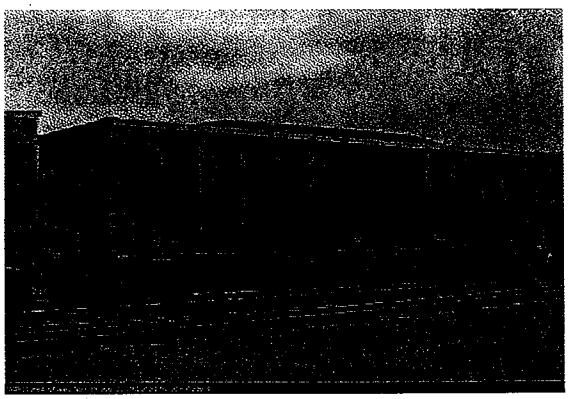
[4] Some open hoppers are equipped with rotary couplers so they can be flipped to unload coal from the top at destinations requiring this type of unloading. Despite the fact that these cars can unload from the top, such cars are still classified as open hoppers. Only coal cars with enclosed bottoms are classified as gondolas.

Hopper Car



Gondola Car



Further, with the shift to higher capacity (286,000-pound) cars, steel gondolas were generally replaced with lower weight aluminum cars, so rust no longer presents a problem with holes in the tub of these cars.[5]

Every loaded coal car, gondola or bottom-dump, that traverses the Joint Line and Union Pacific's coal corridor is fully open on the top and thus, coal can escape from the top into the right-of-way. But only the one-third of the cars that are bottom-dump cars can emit coal from the bottom of the car. The difference between the amount of coal dust measured blowing off the top and that falling out of the bottom of each car (225 pounds vs. 38 pounds) combined with the prevalence of gondolas over bottom-

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[5] Most of our shippers' fleets are comprised principally if not exclusively of aluminum cars and all Union Pacific coal gondolas are aluminum. More coal can be loaded into aluminum cars because of their lower tare weight, so aluminum cars tend to be used and steel cars parked when customers do not need to use all of their fleets.

dump cars on Union Pacific lines suggests that the bottom-losses account for only 5% of the total coal dust deposited on our track.[6]

Accordingly, it was perfectly reasonable for BNSF to focus on mitigating emissions from the top of the cars since they are the predominant source of coal dust deposited on the railroad right-of-way. Further, since Union Pacific has taken steps to prevent coal loss from the bottom of cars and continues to do so, as I explain below, the potential for preventing future coal dust emissions will be found in focusing on coal dust blowing off the top of carloads.

Prevention of Coal Dust Escaping from the Bottom of Shipper Cars

Shippers, not Union Pacific, decide whether to use gondolas or bottom-dump cars to transport their coal. Shippers supply over 90% of the railcars used to transport SPRB coal on Union Pacific lines.[7] Union Pacific supplied bottom-dump cars for only 3% to 6% of its SPRB shipments during the years 2007 through 2009. (Ex. RAB-2)

When shippers decide to use hoppers for their coal, they have many opportunities to reduce coal dust losses from the bottom of their cars. First, to the extent shippers choose to use bottom-dump coal cars, they are responsible for maintenance and repair of those cars. Shippers can and should make certain that the closures and gates on those cars work properly and close tightly each time the car returns to the generating plant to unload and/or when the car is released from the shop where the shipper sends it

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6 See workpaper at back of this submission for calculation.

7 In 2007, Union Pacific transported 91% of the coal it transported from the SPRB in cars owned by its customers. In 2008, that figure was 90% and in 2009, it increased to 94%.

for maintenance. Second, shippers can proactively repair or replace their hopper cars to reduce gaps or holes or loose fitting gates from which coal dust might escape.

If the integrity of the bottom-dump cars is consistently inspected and well-maintained as it should be, there is no reason to believe that substantial amounts of coal will escape from the bottom of the car as compared to the top. Furthermore, the vast majority of cars used to move coal are customer-owned and maintained, which limits Union Pacific's ability to control or prevent the loss of coal from the bottom of most coal cars. And Union Pacific already exercises in full its limited ability to prevent coal loss from the bottom of cars.

Union Pacific train crews inspect coal cars at both origin and destination as required by the FRA when the train is released by the customer for movement. Union Pacific mechanical forces, or carmen, conduct an intermediate terminal inspection at North Platte on every SPRB train.[8] For those trains with a longer trip, where an additional inspection is required on a round-trip, Union Pacific also performs mechanical inspections at Coffeyville, or Parsons, Kansas. Union Pacific's carmen follow a detailed checklist when inspecting coal cars. The inbound inspection includes looking for leakage and examining outlets and doors for damage and to see if they are inoperable. When the train leaves the terminal, they check again that doors are closed and secure. If Union Pacific's mechanical team determines that a railcar is somehow defective, for example, where excessive coal is being released from the bottom of the railcar due to an improperly closing gate, Union Pacific will "bad-order" the railcar and hold it for

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[8] The intermediate terminal inspection required by FRA rules is often called the 1000-mile or 1500-mile inspection because long-haul unit trains must undergo these terminal inspections even though they otherwise run-through terminals unlike manifest trains.

instructions from the car owner for making the necessary repair.[9] If Union Pacific determines a railcar is so damaged or defective that it cannot be repaired, such as coal flowing from the bottom of a railcar due to a missing or badly misaligned gate, Union Pacific has no option—it must "bad-order" the defective railcar and pull it from service. We have a clearly defined process that our employees follow when they identify hoppers that leak or would leak if loaded. We know that process is identifying leaking hoppers, but we are not seeing a problem with hoppers moving coal.

Union Pacific's Efforts Reduced Coal Dust Emissions from the Bottom of the Railcars it Owns

While Union Pacific's inspection and maintenance practices minimize the amount of coal lost through defective bottom-dump cars owned by our customers as well as our cars, Union Pacific has taken additional steps to prevent coal dust falling from the bottom for our fleet of bottom-dump railcars. As previously noted, from 2007 through 2009, Union Pacific's fleet of bottom-dump hoppers moved only 3-6% of its SPRB carloads. (Ex. RAB-2). Even so, Union Pacific has taken measures to review and improve upon its own railcar fleet of bottom-dump cars to ensure that they do not release coal dust. Beginning in late 2005 and continuing through 2009, Union Pacific upgraded 1,508 of its hoppers from a 263 GWR maximum capacity to 286 GWR maximum. This "286 upgrade" program focused on improving railcar structure to allow for an increase in gross rail loading. As part of this upgrade, we checked and adjusted each of these 1,508 cars' hopper doors to ensure the doors properly fit upon locking and unlocking the doors.

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9 Rule 1 in the Field Manual of AAR Interchange Rules provides that the car owner should repair cars insofar as it is practical. The rule then specifies procedures that the railroad that discovers defects in cars that it does not own must follow so that the owner can arrange the repairs. Only defects that would prevent the bad ordered car from moving safely to the repair shop specified by the owner are to be repaired by the railroad. Rule 1.2.a.(2) and (6).

During this process we also repaired any and all holes and openings caused by loose fitting gates. From 2005-2009, Union Pacific spent $2.4 million on repairs on gates for its bottom-dump cars that can move coal. So even though Union Pacific's railcars account for a very small percentage of the railcars used for transport along the Joint Line, Union Pacific has made significant efforts to reduce the bottom-loss coal emissions it is able to control.

Conclusion

Studies have shown that the majority of coal dust releases from moving coal cars are from the top of the cars, not from the bottom. In addition, to the extent there are releases of coal dust from the bottom of coal cars, such releases are largely limited to bottom-dump cars, which were used by Union Pacific's coal customers for only one-third of the SPRB loads. Furthermore, repair and maintenance practices are already in place to minimize the release of coal dust from the bottom of coal cars. For all these reasons, BNSF's focus on releases from the top of coal cars in its coal dust mitigation rule is reasonable and appropriate.

STATE OF NEBRASKA)
)
COUNTY OF DOUBLAS)

VERIFICATION

I, Rex A. Beck, General Manager-Freight Car in the Mechanical Department of Union Pacific Railroad Company, declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed on this 29th day of April, 2010.

Rex A. Beck

Subscribed and sworn to before me this 29th day of April, 2010.

Notary Public

My Commission Expires: 12-5-11

GENERAL NOTARY - State of Nebraska
MAUREEN FONG HINNERS
My Comm. Exp. Dec. 5, 2011

Exhibit RAB-1

REDACTED

Exhibit RAB-2

Union Pacific
SPRB Carloads by Car Type and Car Owner

2007	Gondolas	%	Hoppers	%	Other*	%	Total	%
Union Pacific	69,385	4%	64,750	4%	8,813	1%	142,948	9%
Other Railroads	-	0%	1	0%	1,047	0%	1,048	0%
Private	1,040,372	63%	463,570	28%	3,602	0%	1,507,544	91%
Total	1,109,757	67%	528,321	32%	13,462	1%	1,651,540	100%

2008	Gondolas	%	Hoppers	%	Other*	%	Total	%
Union Pacific	66,538	4%	95,723	6%	2,525	0%	164,786	10%
Other Railroads	17	0%	7	0%	777	0%	801	0%
Private	1,073,701	62%	488,312	28%	4,644	0%	1,566,657	90%
Total	1,140,256	66%	584,042	34%	7,946	0%	1,732,244	100%

2009	Gondolas	%	Hoppers	%	Other*	%	Total	%
Union Pacific	42,678	3%	43,471	3%	94	0%	86,243	6%
Other Railroads	28	0%	328	0%	172	0%	528	0%
Private	971,967	65%	431,910	29%	1,820	0%	1,405,697	94%
Total	1,014,673	68%	475,709	32%	2,086	0%	1,492,468	100%

*These are shorter open-top, bottom-dump hoppers called "Ore jennies" that were originally designed to haul iron ore.

Exhibit RAB-2

REPLY VERIFIED STATEMENT OF
DOUGLAS GLASS

INTRODUCTION

My name is Douglas Glass. As Vice President and General Manager of Energy Marketing, I sponsored a verified statement as part of Union Pacific Railroad Company's opening comments in this proceeding. Union Pacific's opening comments explained how the accumulation of even moderate amounts of coal dust in ballast threaten the safety, reliability and efficiency of rail transportation; established that we expect all of our customers to secure their lading so that it remains in the railcar; demonstrated why preventing the emission of coal dust is superior to cleaning it up afterwards; and described how Union Pacific seeks to engage its customers in collaborative efforts to develop and implement coal dust mitigation.

We also explained why, in our view, the BNSF tariff rules at issue in this proceeding do not apply to Union Pacific customers, whether they are shipping under our contracts or common carrier tariffs. We acknowledged that BNSF had adopted a similar operating rule for the Joint Line that applied to Union Pacific trains. We noted, however, that BNSF has not stopped or threatened to stop Union Pacific trains that exceeded the dust standards, but if BNSF were to stop Union Pacific trains from running on the Joint Line, Union Pacific would strenuously object to this Board. We also explained why we believe such BNSF action would be counter-productive and therefore unlikely.

This proceeding is directed at the reasonableness of tariff rules published by BNSF, not Union Pacific, and those tariff rules apply to BNSF customers, not Union Pacific customers. Nonetheless, Union Pacific chose to participate in this proceeding because our experience in

transporting SPRB coal over the Joint Line and our own lines convinced us that coal dust is a serious problem; that preventing coal dust deposits will further safe, reliable and efficient transportation; and that actions within railroad control alone cannot prevent future coal dust fouling of the roadbed. We hope that the Board's decision will recognize the need to allow railroads the flexibility to establish operating rules and practices in response to the latest available information.

SUMMARY OF SHIPPERS' AND ASSOCIATIONS' ARGUMENTS AND ROAD MAP TO UNION PACIFIC'S REPLY

I found that the opening comments by shippers and associations who oppose the BNSF tariff rules fell generally into three categories. First, they expressed skepticism about the need for and the efficacy of the BNSF tariff rules setting a limit on coal dust emissions by a train and specifying how coal loads should be profiled to reduce coal dust emissions. Many of those questions or criticisms were anticipated in Union Pacific's and BNSF's opening comments and evidence. In Union Pacific's reply, Rex Beck, General Manager – Freight Car, addresses the Coal Shippers' concerns about coal loss through the bottom of cars relative to the top.

Second, opponents of the BNSF tariff rules claim that BNSF is obsessing about coal dust and ignoring other substances that foul ballast. On opening, both BNSF and Union Pacific submitted evidence that demonstrated that the quantity of coal dust and its deposition rate, combined with its physical characteristics, make coal dust a very serious threat to track stability and service if the emissions do not decline. Dexter McCulloch of Shannon & Wilson explains why a modest volume of coal dust in ballast presents a greater threat to ballast stability than a

fouling agent that weighs more. Mr. McCulloch also confirms that coal dust accelerates the need for undercutting to every three to six years or less.

I will direct my reply verified statement to the third major theme in the opening comments of those objecting to the BNSF coal dust tariff rules. First, I will show that the allegation that all of the benefits of the BNSF coal dust rules accrue to BNSF's benefit and all of the costs to the shippers is wrong. Coal Shippers' cost-benefit analysis is seriously incomplete and fatally flawed. Their analysis weighs the entire estimated cost of spraying all PRB coal against the costs of removing coal dust from only the Joint Line[1] and immediately adjacent BNSF lines, instead of all of the increased maintenance associated with those PRB carloads across the core of Union Pacific's coal network. Further, the analysis ignores the impact of undercutting and other maintenance on non-coal customers. Finally, it also ignores the short and long term benefits to coal customers of reducing coal dust deposits on the roadbed.

Second, I will respond to opponents' claims that current railroad rates already cover the full cost of removing the coal dust. Those claims reflect the mistaken assumption that Union Pacific ignores the market for coal and coal transportation and relies wholly on cost formulas to determine its coal rates. {[redacted]}

[1] Union Pacific and BNSF both originate SPRB coal on the Joint Line which extends from MP 15 to MP 117 on the BNSF Orin Subdivision. In addition, BNSF serves Powder River Basin ("PRB") mines north of Gillette, Wyoming.

[redacted]

COAL SHIPPERS' COST-BENEFIT ANALYSIS IS INCOMPLETE

The Coal Shippers rely on a cost-benefit calculation by Mr. Thomas Crowley to support their claim that BNSF derives all of the cost savings associated with the coal dust rules while the coal shippers bear all of the costs. Although I cannot review all of Mr. Crowley's statement or exhibits to the extent they rely on highly confidential documents produced by BNSF but not available to Union Pacific employees, profound defects in his analysis are still obvious.

First, Mr. Crowley compared the cost of spraying all PRB coal against cost savings only on the Orin Subdivision and BNSF PRB segments north of Gillette.[2] Of course, Union Pacific customers are not subject to the BNSF tariff rules at issue as we demonstrated in our opening comments. Consequently, it is inappropriate to include the cost of spraying coal moving on Union Pacific lines in the cost of compliance with BNSF tariff rules. On the other hand, we believe the benefits of reducing coal dust emissions are substantial and we have encouraged our customers to reduce their emissions -- although neither the BNSF rules nor Union Pacific

2 [redacted]

require customers to spray the coal. In fact, Union Pacific is actively exploring a variety of alternatives, including the possibility of mechanically compacting coal or using car covers. We have been particularly interested in compaction, since compaction will reduce the profile of the load above the side sill, potentially force coal fines to the center of the load, where they would be more secure and less likely to blow off the top of the car, and would not consume water or other products, unless a final chemical spray was applied for added effectiveness.

Second, if Mr. Crowley's analysis does include the cost of treating all coal whether originated by BNSF or Union Pacific, then it must also include all of the costs avoided as a result of reducing coal dust emissions. Instead, Mr. Crowley's calculation of savings is limited to the Joint Line and adjacent lines in the PRB.[3] Mr. Crowley ignored the cost of coal dust removal on 1,590 miles of the Union Pacific SPRB coal corridor in eastern Wyoming, across Nebraska and into northeastern Kansas. Yet the presence of coal dust hundreds of miles beyond the Joint Line is no secret. On July 17, 2009, I sent a letter to all of our SPRB coal customers telling them we had found disturbing amounts of coal dust well beyond the Joint Line. (Ex. DRG-1). Further, I understand that Union Pacific produced in discovery a copy of both the 2008 and 2010 Shannon & Wilson reports[4] that confirmed the presence of coal dust throughout Union Pacific's coal corridor by taking core samples, and analyzed the amount of coal dust by volume. Mr. Crowley

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[3] Coal Shippers' Opening, Crowley VS at 14.

[4] These reports were produced in these proceedings at Bates numbers UP-AECCBN-0010275 (native format) and UP-AECCBN-0013428-13538, respectively. They were also attached to Mr. Connell's VS to Union Pacific's Opening Evidence as Exs. DC-8 and DC-10, respectively.

also ignored the cost of train delay on Union Pacific lines due to slow orders and curfews for undercutting and other maintenance activities associated with the coal dust.

Third, Mr. Crowley disregarded the impact of coal dust on safe, reliable and efficient service for Union Pacific customers who ship commodities other than coal. Union Pacific movements of SPRB coal share a Y-shaped corridor from O'Fallons, Nebraska through Gibbons to Menoken Jct., Kansas and to Fremont, Nebraska with hundreds, if not thousands, of other Union Pacific customers. In fact, before Union Pacific/CNW began serving the SPRB Joint Line in late 1984, the Union Pacific Overland Route in Nebraska was renowned for both its volume and mix of freight trains. Today it remains a favorite of rail fans for the frequency and the variety of trains that can be seen. Figure DRG-2 shows a schematic representation of the Union Pacific lines included within the Shannon & Wilson study with a train count on the different segments. Due to the recession, there was a dramatic economic decline in traffic during 2008, so we used 2007 as the best representation of volume and mix. While 2009 traffic levels have recovered from 2008, the volume is still lower than in 2006 and 2007.

The segment depicted between North Platte and Gibbon averaged 140 trains every day. On a given day, that number would include 75 coal trains, half loaded and half empty. It would also include 28 manifest trains consisting of more than 100 cars for many different customers. Time-sensitive intermodal trains and auto trains numbered 21 and six, respectively. Ten more trains for grain and other commodities accounted for the rest. Hundreds of Union Pacific customers with cars on those 65 daily non-coal trains will benefit if less coal dust is deposited

on that track. Conversely, their service and equipment utilization will deteriorate if Union Pacific must undercut 265 miles of track year-in and year-out in order to keep up with coal dust being deposited by the daily 35 to 37 loaded coal trains. The other five segments east of O'Fallons tell the same story of intense use by many Union Pacific customers moving virtually every commodity that is transported by rail.

Finally, Mr. Crowley ignores the benefits to coal shippers of reducing coal dust emissions from their trains. They pay for coal and transportation of the coal on the basis of the weight of the coal when loaded. If 225 pounds of coal per car are lost en route,[5] then they have lost a ton of coal for every 9 cars. In addition, the increased maintenance curfews for undercutting, switch-cleaning and replacement will reduce their car utilization for their fleets. I do not claim that these savings equal the cost of spraying. But they are tangible benefits to the coal shippers. Moreover, Union Pacific is optimistic that with the assistance of engaged customers, we can develop lower cost alternatives to control coal dust. For example, {[redacted]} This is no surprise. As more creative and effective solutions to coal dust emissions are developed and tested, costs can be expected to decline and Union Pacific is working with vendors and our customers to insure that remediation solutions are competitive and cost effective. By all

[5] Tests conducted as part of an NCTA-sponsored task force are the source for this figure. See Reply Verified Statement of Rex A. Beck at p. 3-4, submitted in support of Union Pacific's Reply Evidence.

appearances, the cost of treating coal cars to reduce dust emissions is being driven down by innovation and competition and has not yet reached its bottom.

REMOVING THE COAL DUST MUST STILL BE PAID FOR

The shippers correctly recognize that removing the coal dust must be paid for out of the revenues Union Pacific receives from its customers. After all, that is true of each and every expenditure that we make. Their mistake lies in believing that they have already paid for the increased levels of undercutting and other maintenance required by coal dust emissions.

Before I explain why those claims are mistaken, I will explain why in a proceeding challenging BNSF tariff rules that do not apply to Union Pacific customers, Union Pacific finds it necessary to respond to shipper claims about coal rates. Unfortunately, some of the shippers have addressed their comments to railroad rates generally. See Ameren Op. Evid. at 8-9; TUCO Op. Stmnt. at 3 (economic windfall to BNSF and other coal hauling railroads). {[redacted]} Certainly Ameren's request that the Board's decision state that railroads may not use the coal dust issue as an improper way to raise rates demonstrates its intention to expand the scope of this proceeding from a determination of whether certain BNSF tariff rules are an unreasonable practice to a much broader ruling that would encompass Union Pacific rate-making. Id.[6]

6 {[redacted]}

The claims that rail rates for coal already cover the cost of removing coal dust at the frequency and intensity that is necessary to ensure safe and reliable service[7] across Union Pacific's entire coal network is merely an assertion with no data behind it. First, the assumption that Union Pacific sets its coal rates based on a cost formula may reflect the experience of those of our customers whose own electric power rates are set by public service commissions on a cost plus basis. This is not our experience, nor our practice. Union Pacific sets its rates in accordance with the marketplace for coal and coal transportation. Numerous factors influence the rates we negotiate with our SPRB customers including {[redacted]}

Second, most SPRB coal on Union Pacific moves under contract rates. {[redacted]}

[redacted]}

7 Associations' Initial Comments at 5.

[redacted]

Finally, unless a firm recovers all of its operating expenses and earns an economic profit that is a return on investment equal to its cost of capital, then that firm has not recovered all of its costs. The STB has consistently found that Union Pacific is not earning its cost of capital through 2008. As our ROI fell to 8.6% in 2009, it seems almost certain that the Board will find that we will not earn our cost of capital for 2009 either. If Union Pacific as a whole has not recovered its costs as a network, then coal rates cannot have paid for all of the costs associated with moving coal. If you could take a rail network and break it down into component elements, you would find compelling evidence that coal was paying less than its share of the costs to

sustain the network. For example, coal accounted for 45.5% of our revenue-ton-miles, which drive costs, but contributed only 23.3% of our revenue to pay those costs in 2009. That relationship of coal bringing in half the revenue relative to the work associated with hauling it has persisted over time. {[redacted]}

CONCLUSION

In summary, the Coal Shippers' cost-benefit analysis with respect to BNSF's coal dust mitigation rules is based on erroneous and incomplete assumptions. The shippers' claims that they have already paid for the cost of dust removal through their rates is also in error, at least with respect to Union Pacific's rates, which are developed based on the market and not cost formulas. Vendor solutions for preventing coal dust from contaminating the roadbed are becoming more innovative and are expected to become more cost effective, as one would expect in any nascent application. As in safety, manufacturing, electric power production and rail transportation, doing things in a sound manner in the first instance is always the least cost and most effective long term solution. I urge the Board to allow the railroads the freedom and flexibility to independently work with our shippers and the rest of the industry to apply standards and set expectations for preventing coal dust from contaminating our trackbed.

VERIFICATION

STATE OF NEBRASKA)
)
COUNTY OF DOUBLAS)

I, Douglas Glass, Vice President and General Manager-Energy of Union Pacific Railroad Company, declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed on this 29 day of April, 2010.

Douglas J. Glass

Douglas Glass

Subscribed and sworn to before me this 29th day of April, 2010.

Maureen Fong Hinners

Notary Public

My Commission Expires: 12-5-11

GENERAL NOTARY - State of Nebraska
MAUREEN FONG HINNERS
My Comm. Exp. Dec. 5, 2011

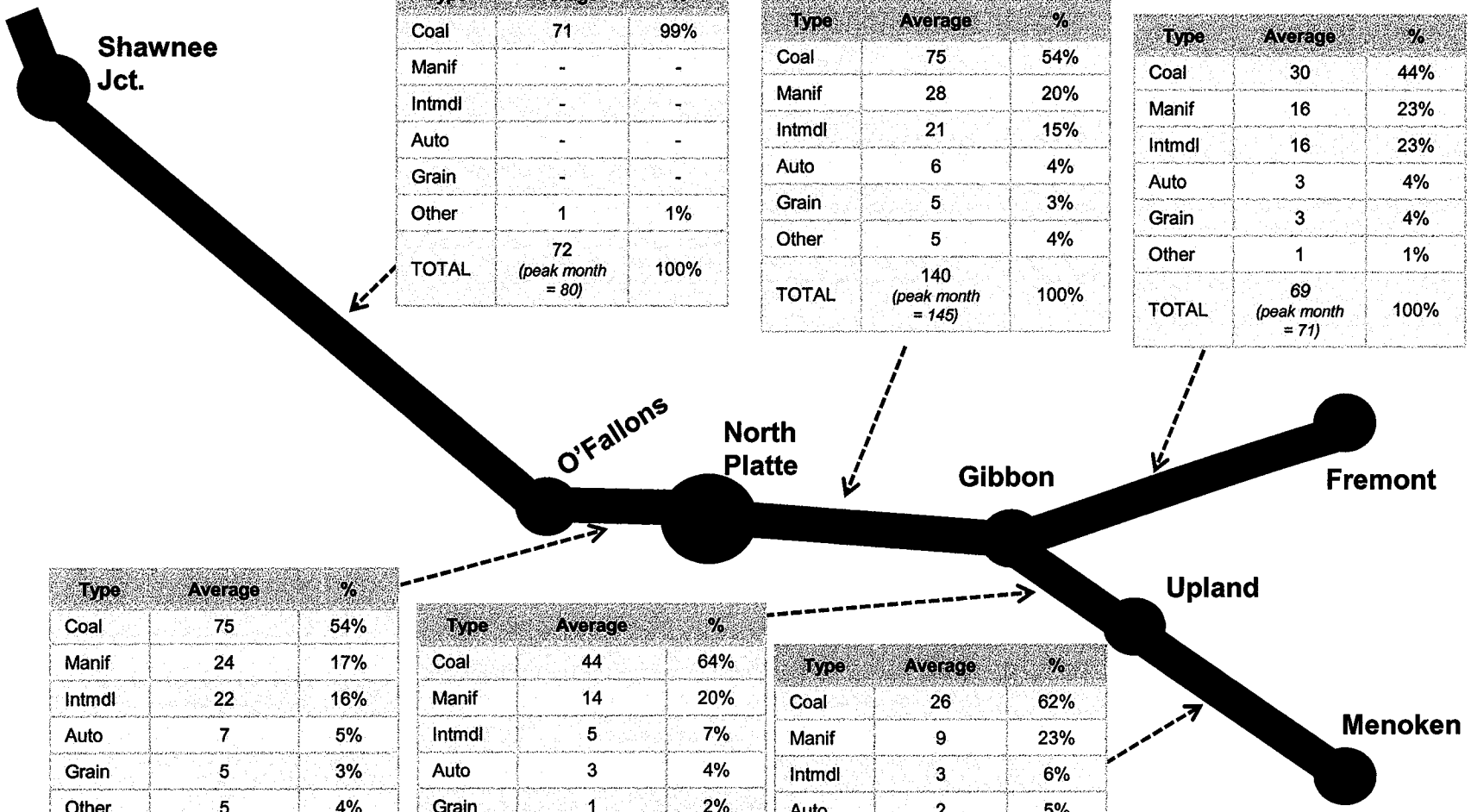
Exhibit DRG-1

REDACTED

Exhibit DRG-2

2007 Trains per Day

Shannon and Wilson Study Area



Type	Average	%
Coal	71	99%
Manif	-	-
Intmdl	-	-
Auto	-	-
Grain	-	-
Other	1	1%
TOTAL	72 *(peak month = 80)*	100%

Type	Average	%
Coal	75	54%
Manif	28	20%
Intmdl	21	15%
Auto	6	4%
Grain	5	3%
Other	5	4%
TOTAL	140 *(peak month = 145)*	100%

Type	Average	%
Coal	30	44%
Manif	16	23%
Intmdl	16	23%
Auto	3	4%
Grain	3	4%
Other	1	1%
TOTAL	*69* *(peak month = 71)*	100%

Type	Average	%
Coal	75	54%
Manif	24	17%
Intmdl	22	16%
Auto	7	5%
Grain	5	3%
Other	5	4%
TOTAL	138 *(peak month = 142)*	100%

Type	Average	%
Coal	44	64%
Manif	14	20%
Intmdl	5	7%
Auto	3	4%
Grain	1	2%
Other	2	3%
TOTAL	69 *(peak month = 73)*	100%

Type	Average	%
Coal	26	62%
Manif	9	23%
Intmdl	3	6%
Auto	2	5%
Grain	1	2%
Other	1	1%
TOTAL	42 *(peak month = 47)*	100%

Work Papers

Workpaper for Revenue/Revenue-Ton-Miles Comparison

	Revenue	**Revenue-Ton-Miles**
	(millions)	(billions)
Energy	3,118	218
Total	13,373	479
Line 1/Line 2	23.3%	45.5%

Source: Union Pacific Corporation 2009 Analyst Fact Book pages 6 and 32 for Total and page 24 for Energy.

REDACTED

REDACTED

REDACTED

CERTIFICATE OF SERVICE

I hereby certify that on this 30th day of April, 2010, I have served a copy of the above Reply Evidence and Argument of Union Pacific Railroad Company and accompanying Verified Statements via Federal Express on the following parties of record:

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