

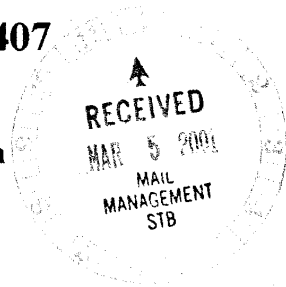
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STB Finance Docket No. 33407
Surface Transportation Board

Attention: Ms. Victoria J. Rutson
Environmental Project Director
Environmental Filing



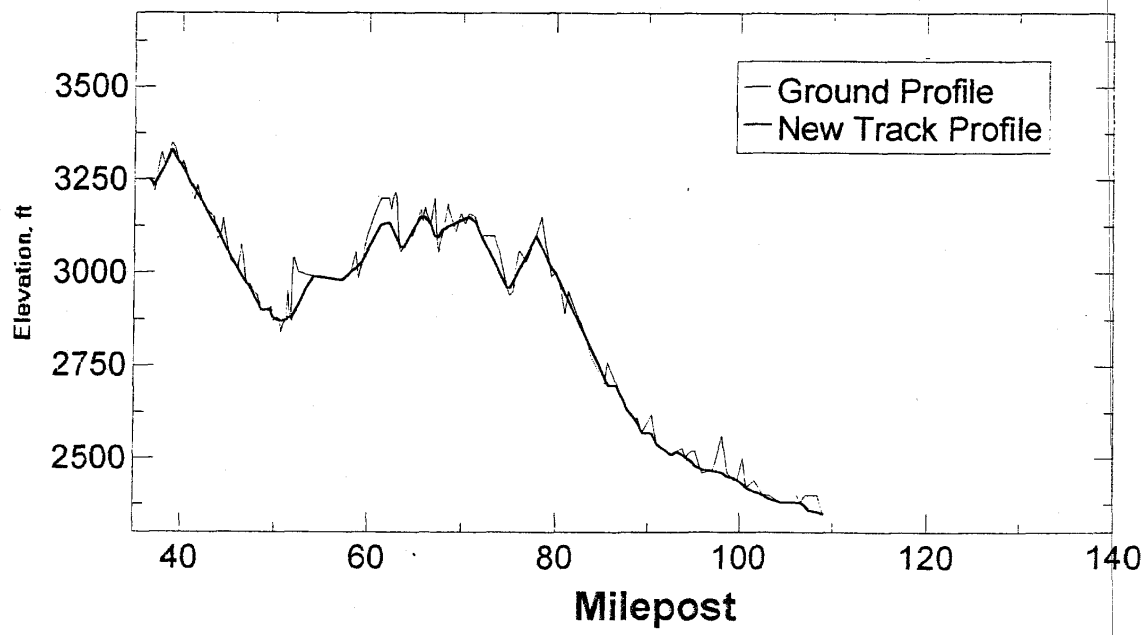
Comments on PRB Expansion DEIS

submitted by

Brian Brademeyer
Transportation System Analyst

February 25, 2001

DM&E Alt C Smithwick to Wasta -- 72.7 Miles



February 25, 2001
PO Box 762
Rapid City, SD 57709
(605) 348-8404

Office of the Secretary
Case Control Unit
STB Finance Docket No. 33407
Surface Transportation Board
1925 K Street, N.W.
Washington, DC 20423-0001

ATTENTION: Ms. Victoria J. Rutson
Environmental Project Director
Environmental Filing

Re: Comments on PRB Expansion DEIS

Dear Ms. Rutson:

The DEIS for the Powder River Basin Expansion Project has completely failed to assess and disclose the critical environmental impacts associated with soil disturbance from railroad construction activities. The quantities of earthworks associated with each alternative must be a primary factor in weighing the desirability of the various alternatives, but so far have not been. The earthworks associated with three critical Pierre shale segments must be investigated in detail: the Pierre bypass, the "Wall Hill", and the Cheyenne River Valley, but again so far have not been. And operational alternatives that reduce design speed on these critical segments in order to minimize earthwork disturbance to unstable Pierre shale formations must also be fully explored, but so far have not been. To comply with NEPA, the earthworks for these three critical segments must be fully evaluated in a supplemental draft EIS that is submitted to the public for review and comment.

To again briefly state my qualifications to raise these concerns: I am a trained Civil Engineer with Bachelor's and Master's Degrees in Civil Engineering from the Massachusetts Institute of Technology. My professional background includes 15 years as a Research Engineer in MIT's Transportation Systems Division, where I specialized in transportation and highway needs of developing countries. I have also analyzed railroad construction, maintenance and operations in Africa, Europe, and North America.

I have tried to make these comments as "concise, clear, and to the point" as I possibly can in keeping with the direction in NEPA. My three previous scoping letters are included as attachments that should be read before continuing with these current comments. The Board and cooperating agencies must provide supporting evidence that they have made the environmental analyses necessary to determine the earthworks implications of the various routing and operating alternatives that are available on the three critical segments.

Problem 1. Inadequate evaluation and disclosure of earthworks impacts.

In all my experience as a professional transportation system analyst, I have never encountered a construction project evaluation that failed to focus on earthworks as a critical cost and impact center, and as a source of potential tradeoffs with future operating and maintenance costs. Until the DM&E expansion project into the Powder River Basin, that is. This is shocking, given that the impacts associated with construction of this project are most pronounced and also most significantly adverse to the environment on the Pierre shale segments along the Cheyenne River Valley.

The environmental impacts associated with soil disturbance through railroad embankment construction activities are critical to an informed decision on the best choice of alignment for the proposed expansion project. A majority of the impacts evaluated in Appendix L are proportional either to the area of disturbed soil or to the volume of disturbed soil. Yet no measures of either of these two primary indicators are presented in the DEIS, either for the alternatives as a whole or for critical segments where earthworks are the key criterion, such as the Pierre shale segments. The maps in Volume 5 present no information on extent of soil disturbance. The tables of "transportation related impacts" in Appendix G provide no data whatever on earthwork quantities. (In fact, the entire Appendix G should have been replaced by a single nomograph that could be used by the public to evaluate additional assumptions on future operations, such as those suggested in Attachment 3.) And while the aerial photos of the various segments in the Corps of Engineers file materials do indicate the cut and fill slope boundaries, these are not summarized for the decisionmakers in any helpful way. Moreover, these USACOE materials are not widely available to the general public.

Recommendation 1. Earthworks quantities are an indicator that can sharply define the impacts of the various alternatives, since numerous impacts are affected by either area or volume of disturbed soils. To provide a clear basis for choice among these options by the decisionmaker(s) and the public, these quantities must be presented in comparative and easily understandable forms. In addition to aggregate measures such as square yards of cut and fill slopes and cubic yards of disturbed soils, the earthworks impacts should also be presented in graphical form. Graphical presentations should include plotting areal measures (such as the widths of the cut and fill slopes) vs. milepost, and volume measures (such as cubic yards per yard of track or cubic yards per 100 yards of track) vs. milepost.

Problem 2. Inadequate disclosure of earthworks impacts along the Cheyenne River Valley, the "Wall Hill", and the Pierre Bypass.

Earthworks-associated impacts have been used indirectly to dismiss alternatives in the DEIS. The Pierre Bypass was deemed "unreasonable" in part because the topography "would require extensive cuts and fills to establish a safe and suitable grade for operation of unit coal trains" [DEIS at 2-65]. Yet these earthworks were never documented for the public or the decisionmaker to compare to impacts on other critical segments. Suppression of such information prevents fully-informed decisionmaking, since neither the public nor the

decisionmaker can determine whether other critical segments are also "unreasonable". Similarly, the route proposed by the Applicant for the "Wall Hill" was claimed to be "the only practical and feasible solution to the operational problems at Wall" [DEIS at 2-16, footnote 7], without any supporting evidence whatsoever. And the existing corridor between Wasta and Smithwick was dismissed from evaluation in all "existing corridor" alternatives due to concerns outside the Wasta to Smithwick segment [DEIS at 2-47 to 2-49]. The Applicant had initially alleged this segment could not be reconstructed because "the Black Hills are in the way" [Applicant's Alternative Routes Analysis, p. 11].

None of these excuses meets the NEPA mandate to analyze all reasonable alternatives. It is imperative that the earthworks measures from Recommendation 1 above be presented for both area and volume measures, and for all routing and operational alternatives, on all three of the critical Pierre shale earthworks segments: the Pierre Bypass, the "Wall Hill", and the Cheyenne River Valley between Wasta and Smithwick, SD.

Recommendation 2a. Fully document the earthworks cut/fill areas and volumes for preferred Alternative C between Wasta and Smithwick. Document all earthworks as described in Recommendation 1 above. The likely costs from interruption of service along the Alternative C route within the Cheyenne River Valley caused by significant landslides or slumping banks should also be assessed.

Recommendation 2b. Fully document earthworks cut/fill areas and volumes for preferred Alternative C between Wasta and Wall that has been included in the DEIS on pages 2-16 and 2-17. Document all earthworks as described in Recommendation 1 above. The likely costs from interruption of service along the preferred Alternative C route caused by significant landslides or slumping banks along the "Wall Hill" should also be assessed.

Recommendation 2c. Fully document the earthworks cut/fill areas and volumes for the Pierre Bypass alternatives using the alignments shown in Figure 2-23 of the DEIS. Document all earthworks as described in Recommendation 1 above. The likely costs from interruption of service along the Bypass routes caused by significant landslides or slumping banks along climb out of the Missouri River Valley should also be assessed.

Problem 3. Inadequate consideration of existing corridor alternatives along the Cheyenne River Valley and the "Wall Hill".

In my August 8, 1999 letter to STB (see Attachment 1), I pointed out the serious flaws in the Applicant's dismissal of using the existing corridor between Wasta and Smithwick, SD. Use of the existing corridor would avoid the unstable Pierre shale formations within the Cheyenne River valley. The DEIS continues to give inadequate attention to this alternative, which was dismissed from evaluation in all "existing corridor" alternatives due to concerns outside the Wasta to Smithwick segment!

As an example of the arbitrary nature of these dismissals, Alternative D-6 was dismissed primarily because it "followed the Alternative C alignment through the State of Wyoming," including over 30 miles of the Thunder Basin National Grassland. [DEIS at 2-48]. This is

accompanied by the unsupported assertion that this alternative would not provide construction or operational advantages over Alternative C, totally ignoring the reduced amounts of Pierre shale formations that would be disturbed on the existing corridor between Wasta and Smithwick. That leaves only the 20-mile difference in length between preferred Alternative C and the existing corridor (with the outer bypass at Rapid City described in Attachment 1) as justification for dismissal of the existing corridor alternatives. This is less than 3% of the 810-mile total project length along the preferred alternative, and is certainly no basis for ignoring the potential environmental benefits of avoiding the Pierre shale formations along the Cheyenne River Valley as much as possible.

The analysis in Attachment 1 suggests that both construction and operational advantages might accrue from avoiding the unstable soils along the Cheyenne River Valley. In that analysis, I compared earthworks and other construction parameters along a reasonably rebuilt existing corridor to the proposed DM&E Alternative C. These calculations show that a rebuild of this section (with a bypass at Rapid City) can meet the geometric constraints of 1% maximum grades and 1 degree maximum curvature at reasonable cost, i.e., that this "obvious" route is in fact a reasonable alternative under the terms of the National Environmental Policy Act (NEPA) and must be analyzed at the same level of detail as all other NEPA alternatives in the Environmental Impact Statement. A supplemental DEIS is needed that fully discloses the difference in earthworks impacts between the existing corridor and the Cheyenne River Valley routes.

In my October 9, 1999 letter to STB (mistakenly dated as September 9, 1999 -- see Attachment 2), I pointed out that DM&E has failed to meaningfully respond to the federal agencies explicit requests regarding analysis of their existing corridor, including the "Wall Hill" climb out of the Cheyenne River Valley beginning near Wasta and ending at Wall, SD. The DEIS continues to ignore this critical segment of the project: "This realignment of the existing system was determined the only practical and feasible solution to the operational problems at Wall, considering the Cheyenne River, engineering requirements to cross Interstate 90, and straighten the overall segment." [DEIS at 2-16, footnote 7]. In my own analysis of the Wall Hill proposal in Attachment 2, I found that the amount of earthworks necessary to exit the Cheyenne River Valley, and the unstable Pierre shale and badlands areas that are encountered along much of the proposed Alternative C alignment between Smithwick and Wall, SD, raise the question of whether it is desirable to enter the Cheyenne River Valley at all, just from an engineering cost perspective, let alone from an environmental impact perspective.

The DEIS needs supplementation on the major public issue of earthworks disturbance to the unstable Pierre shale soils between Smithwick and Wall, SD, and the extent to which utilizing the existing corridor can reduce these soil disturbance impacts.

Recommendation 3a. Fully document the earthworks cut/fill areas and volumes for the rebuilt existing corridor between Wasta and Smithwick using a 49 mph design speed, including any needed sidings and the outer bypass at Rapid City as suggested in my August 8, 1999 scoping letter (see Attachment 1). Document all earthworks as described in Recommendation 1 above.

Recommendation 3b. Fully document the earthworks cut/fill areas and volumes for the rebuilt existing corridor between Wasta and Wall using a 49 mph design speed, using the alignment suggested in my September 9, 1999 scoping letter (see Attachment 2). Document all earthworks as described in Recommendation 1 above.

Problem 4. Inadequate consideration of operational alternatives along the Cheyenne River Valley, the "Wall Hill", and the Pierre Bypass.

The DEIS failed to explore any alternatives that would alter train operations in order to minimize the earthworks-related impacts of railroad construction. It is simply not "reasonable" under NEPA to ignore the potential benefits of speed reductions along the sensitive Cheyenne River Valley area. Yet the DEIS ignores the potential for reduction in disturbance to unstable soils that can be achieved by reducing design speed (i.e., relaxing geometric constraints) along the Cheyenne River Valley from Smithwick to Wall, SD. For example, reducing the operating speed on preferred Alternative C between Smithwick and Wasta to 35 mph would eliminate the travel time advantage that Alternative C enjoys over a rebuilt existing corridor route (72.7 miles at 35 mph taking 125 minutes vs. 92.7 miles at 45 mph taking 124 minutes; the inner bypass route would only take 7 minutes longer at 131 minutes -- see Attachment 1). The DEIS simply did not explore any possible reductions in soil disturbance that would accompany such speed reductions and the reductions in adverse environmental impacts that would accrue as a result of the reduced earthworks. This is not fully-informed decisionmaking.

In fact, all loaded trains were to move at 45 mph, with unload trains moving at 49 mph [DEIS at 1-28]. Geometric constraints of a maximum 1% grade and 1 degree of curvature were determined to allow these design speeds. These geometric design constraints are apparently to be met everywhere except in Pierre and Ft. Pierre, where the existing corridor exceeds the degree of curvature constraint considerably. Elimination of any bypass option in Pierre leaves these localized curvature exceptions in place near the Missouri River crossing. Yet the DEIS fails to explain why geometric constraints should be rigid everywhere else. If these constraints can be violated in Pierre, why not on the Wall Hill? Why not along the Cheyenne River Valley? Why not along the existing corridor between Wasta and Smithwick? The DEIS never addresses these points. In fact, the DEIS does not explore at all the tradeoffs between construction and operational constraints, such as the interrelations between design speed and the magnitude of earthworks construction impacts. Yet these operational constraints are clearly reasonable alternatives under NEPA, especially since they would be critical only on a relatively small portion of the overall project comprising the three critical Pierre shale segments.

To clearly define the tradeoffs to the public and the decisionmaker(s), the affects of design speed on earthworks quantities should be fully investigated along the three critical Pierre shale segments. For specificity, design speeds of 25 and 35 mph, with associated grade and curvature constraints, must be explored as ways to minimize earthworks-related impacts on the Pierre shale segments. If 18,000 horsepower [DEIS at 1-28] can move loaded trains around a 1 degree curve at 45 mph, then what curvature can those same engines negotiate with speeds reduced to 35 mph? Or to 25 mph? Relaxing the geometric

constraints can dramatically reduce the earthworks impacts, and might even make the Pierre bypass "reasonable" to construct. Without a supplemental DEIS, neither the public nor the federal agencies will ever know which combination of operational and construction tradeoffs would yield the best overall project design.

Recommendation 4a. Alternative C from Recommendation 2a above should be re-evaluated under design speeds of 25 and 35 mph between Wasta and Smithwick, including any needed additional sidings. The reduced earthwork cut/fill areas and volumes associated with these reduced-speed alternatives should be assessed in the same manner as in Recommendation 1 above, along with the increased travel time due to the slower speeds.

Recommendation 4b. The Wall Hill alternatives from Recommendation 2b above should be re-evaluated under design speeds of 25 and 35 mph. No additional sidings should be needed on this short segment. The reduced earthwork cut/fill areas and volumes associated with these reduced-speed alternatives should be presented to the decisionmaker as in Recommendation 1 above, along with the increased travel times due to the slower speeds.

Recommendation 4c. The Pierre Bypass alternatives from Recommendation 2c above should be re-evaluated under design speeds of 25 and 35 mph. No additional sidings should be needed on this short segment. The reduced earthwork cut/fill areas and volumes associated with these reduced-speed alternatives should be presented to the decisionmaker as in Recommendation 1 above, along with the increased travel times due to the slower speeds.

Problem 5. Earthworks impacts along the Cheyenne River Valley, the "Wall Hill", and the Pierre Bypass require supplementation.

As has been shown in Attachment 1, the Applicant's preferred Alternative C within the Cheyenne River Valley, using the Applicant's proposed engineering constraints of 1 percent maximum grade and 1 degree maximum curvature, provides little transportation benefit over using the existing corridor between Wasta and Smithwick. As shown in Attachment 2, those same geometric constraints preclude leaving the Cheyenne River Valley and climbing the Wall Hill without an excessive amount of soil disturbance to unstable Pierre shale formations. Rather than being the "only practical and feasible solution," the alignment proposed by the Applicant is "unreasonable" under any meaningful consideration of environmental impacts. To remedy these deficiencies, alternative alignment and operating proposals must be explored along the three critical Pierre shale segments identified above.

Environmentally, staying out of the Cheyenne River Valley entirely would be the most desirable solution, since avoidance is the best mitigation measure under NEPA. A second-best environmental alternative would introduce speed reductions on the critical Pierre shale segments in order to significantly reduce the amount of disturbance to these unstable soils. Design speeds of 25 mph and 35 mph are reasonable alternatives that can

clearly identify potential tradeoffs to the decisionmaker and the public. If the Applicant is unwilling to investigate these reasonable alternatives, the public would be justified in concluding that this entire proposal has been put forward for other objectives (see Attachment 3).

NEPA is clear that analyses must be performed and impacts disclosed before decisions are made and before actions are taken, and that these analyses must be subjected to expert agency comments and public scrutiny. If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, as is the case with the supplemental earthworks analyses recommended here, the agency must include the information in the environmental impact statement. In addition, the people in Rapid City have never been involved in this process, since a meaningful rebuild alternative for the existing corridor between Wasta and Smithwick has never been presented. Given all of the reasons presented in Problems 1-4 above, NEPA supplementation is clearly necessary.

Recommendation 5. In order to meet the clear language of NEPA, the inadequate earthworks analysis on the three critical Pierre shale segments must be corrected in a Supplemental DEIS. The quantities of earthworks associated with each alternative must be a primary factor in weighing the desirability of the various alternatives. The earthworks associated with three critical Pierre shale segments must be investigated in detail: the Pierre bypass, the "Wall Hill", and the Cheyenne River Valley. And operational alternatives that reduce design speed on these critical segments in order to minimize earthwork disturbance to unstable Pierre shale formations must also be fully explored. To comply with NEPA, the earthworks for these three critical segments must be fully evaluated in a supplemental draft EIS that is submitted to the public for review and comment. Within the DSEIS, the Board and cooperating agencies must provide full supporting evidence that they have made the environmental analyses necessary to determine the earthworks implications of the various routing and operating alternatives that are available on the three critical Pierre shale segments.

Sincerely,

A handwritten signature in black ink, reading "Brian Brademeyer". The signature is written in a cursive, flowing style.

Brian Brademeyer

Attachment 1 -- Scoping Letter of August 8, 1999

August 8, 1999
PO Box 762
Rapid City, SD 57709
(605) 348-8404

Office of the Secretary
Case Control Unit
STB Finance Docket No. 33407
Surface Transportation Board
1925 K Street, N.W.
Washington, DC 20423-0001

ATTENTION: Ms. Elaine K. Kaiser
Chief, Section of Environmental Analysis
Environmental Filing

RE: COMMENTS ON APPLICANT'S ALTERNATIVE ROUTES ANALYSIS

Dear Ms. Kaiser:

I am writing to call your attention to some serious deficiencies in the "Dakota, Minnesota and Eastern Railroad -- Applicant Comments on Alternative Routes Analysis" dated June 9, 1999. I am a trained Civil Engineer with Bachelor's and Master's Degrees in Civil Engineer from the Massachusetts Institute of Technology. My professional background includes 15 years as a Research Engineer in MIT's Transportation Systems Division, where I specialized in transportation and highway needs of developing countries. I have also analyzed railroad construction, maintenance and operations in Africa, Europe, and North America.

In response to federal agencies' request for a demonstration of why the existing corridors cannot be used for this project, particularly from Wasta to Smithwick in South Dakota, the DM&E has presented what can charitably only be characterized as "straw man" alternatives that leave these sections in a 19th-century geometric design state:

"The initial reaction of virtually everyone who has looked at the rail map -- including us -- is that we would use our existing line to the east and south of Rapid City in building to the Powder River Basin (PRB). So why is this crazy railroad cutting out across new territory when it already has a route that gets from the same point A (Wall, SD) to the same point B (Smithwick, SD)? That is the first logical question from everyone studying the maps.

The answer to this very logical question is simple. In a nutshell, it is geography. The Black Hills are in the way. ... [A] modern heavy haul railroad will not work on this particular 100-year-old alignment. The grades are too steep. The curves are too sharp. The product(s) is too heavy." [Applicant Comments at 11, emphasis added].

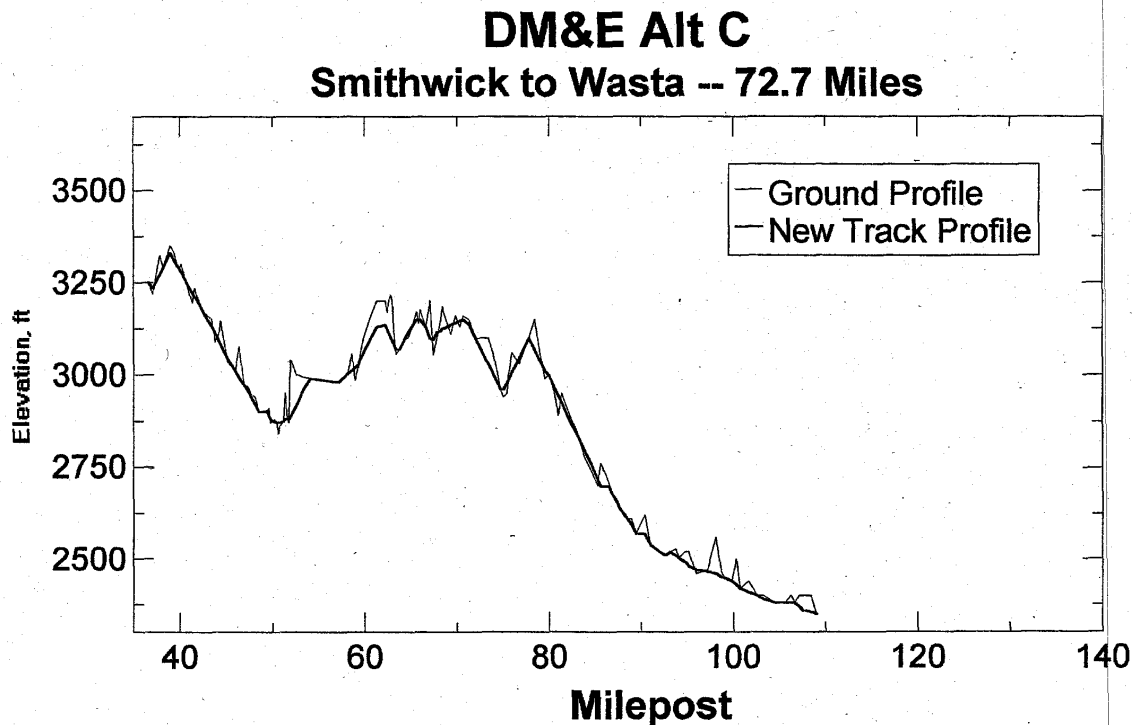
Unfortunately, the request to use existing corridors never envisioned using the current alignment, but rather logically expected that alignment to be upgraded to the design standards governing the project. The proper question, therefore, is: What construction effort would be involved in such an upgrading? DM&E never addresses this obvious technical question, but

even those unfamiliar with the local "geography" should become skeptical when the evidence presented by DM&E asserts that the "*most significant curvature and grade combination is in downtown Rapid City.*" [Applicant Comments at C8, emphasis original]. This hardly supports the absurd assertion that the "Black Hills are in the way."

Since DM&E failed to meaningfully respond to the federal agencies explicit requests regarding the existing corridor, I have myself undertaken to determine what level of earthworks would be required to upgrade the existing alignment between Smithwick and Wasta, SD. I then compare these earthworks and other construction parameters to the proposed DM&E Alternative C, which applicants assert is "reasonable" [Applicant Comments at 7]. These calculations show that a rebuild of this section (with a bypass at Rapid City) can meet the geometric constraints of 1% maximum grades and 1 degree maximum curvature at reasonable cost, *i.e.*, that this "obvious" route is in fact a reasonable alternative under the terms of the National Environmental Policy Act (NEPA) and must be analyzed at the same level of detail as all other NEPA alternatives in the Environmental Impact Statement.

Methodology. With the use of USGS 7.5' topographic maps, I was able to lay out the alignment of Alternative C from Smithwick, SD (northbound milepost 36.3) to where it rejoins the existing line just north of the confluence of the Cheyenne River with Box Elder Creek, south of Wasta, SD (westbound milepost 609.0). A route was laid out on these maps using arcs of 0.95 degree curvature and tangent sections between the arcs. Ruler and protractor were used to lay out the mileposts along this route, and elevations were taken from the topo maps, producing the ground profile shown in Figure 1. The maximum 1% grade constraint (52

Figure 1. Ground and track profile of DM&E's Alternative C between Smithwick and Wasta

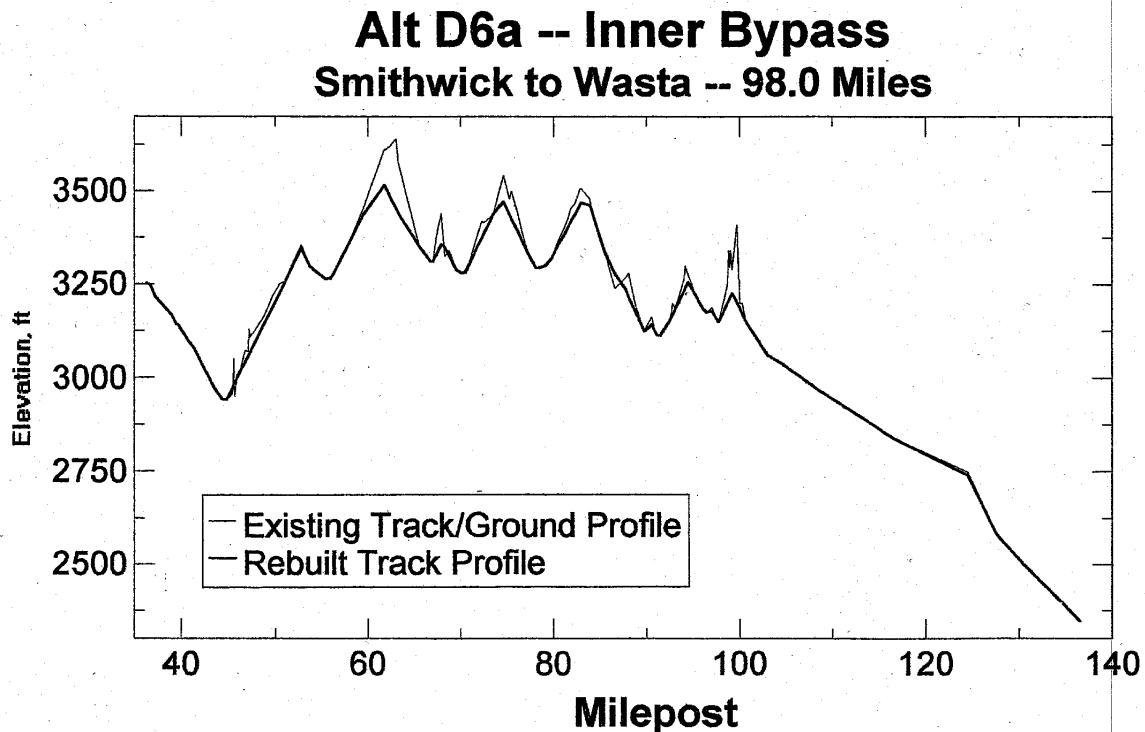


ft/mile) was used to determine the constructed profile of the track along this route. The resulting route was estimated at 72.7 miles. Mileposts are increasing from Smithwick, SD (milepost 36.3).

Similar topographic maps were used to determine the geometric realignment needed along the existing route between Smithwick, SD, and the Wasta junction point. Mileposts and elevations were taken from the milepost charts presented in Attachment 2 to the Applicants Comments. Reducing all curves to 0.95 degree curvature resulted in a shortening of the alignment between Smithwick, SD (northbound milepost 36.3) and Rapid City South (northbound milepost 92.0) of 2.2 miles, primarily as a result of softening the curves at Oral and Fairburn, and straightening the crossing at Spring Creek. Applying the maximum 1% grade constraint, including on the realigned curves, resulted in major cuts at the ridgetops between creek drainages, especially between Lame Johnny and French Creeks (mileposts 59.4 to 65.5), as shown in Figures 2 and 3. The cut on the realigned curve at Fairburn is also visible in these Figures at milepost 67.5. Mileposts are increasing from Smithwick, SD (milepost 36.3). No curvature or grade changes were made along the Box Elder Creek eastbound portion of the route, since these were minor compared to the northbound section between Smithwick and Rapid City.

Bypass Needed. DM&E is correct that no acceptable upgrade is possible along the current route through downtown Rapid City. To determine the construction efforts of a bypass to the east, I developed an "Inner Bypass" (Alternative D6a) which leaves the existing track at northbound milepost 97.0, staying east of Cambell Street and branching northeast after

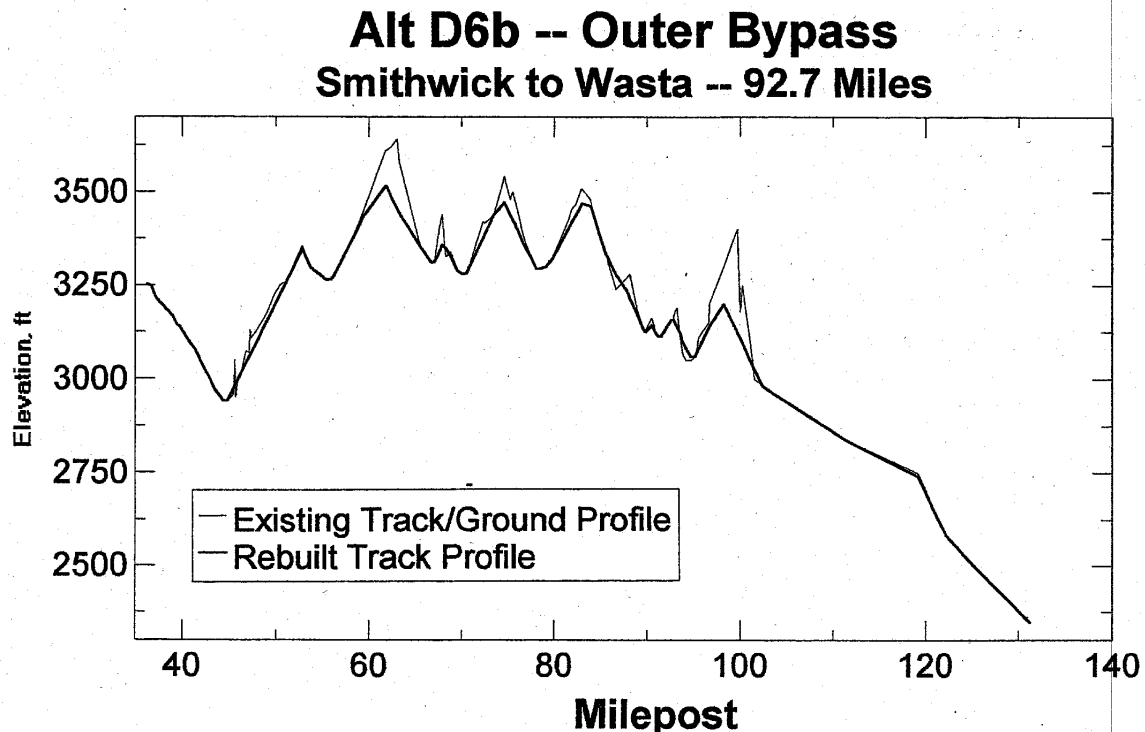
Figure 2. Existing ground and track profile of rebuilt Alternative D6a (Inner Bypass)



crossing St. Patrick Street, joining the existing track at westbound milepost 644.8; and an "Outer Bypass" (Alternative D6b) which leaves the existing route at northbound milepost 92.6 and heads northeast, passing north of the Rapid City Regional Airport, and joining the existing track at westbound milepost 637.9. The Inner Bypass shortened the existing route by an additional 3.5 miles, while the Outer Bypass shortened the existing route by an additional 8.8 miles, resulting in rebuilt lengths of 98.0 and 92.7 miles, respectively. Both bypasses resulted in significant earthworks to cut through the ridge between the Rapid Creek and Box Elder Creek drainages, as shown in Figures 2 and 3, comprising 18% and 35% of total "cut volume" earthworks, respectively. The magnitude of the earthworks increases significantly the further east the ridge crossing occurs, as can be seen by comparing Figure 3 to Figure 2.

Earthworks. The quantity of earthworks was estimated from the height of the "cuts" needed to meet grade restrictions (on the assumption that massive fills over the stream crossings would not be environmentally desirable), weighted by the average of the forward and rearward segment lengths from the as-constructed profile estimates, times an "effective" cut width (taken as 40 yards for this analysis). This resulted in an earthworks "cut volume" index, measured in millions of cubic yards, that can be used to compare the relative grading requirements of the Alternative routes. While it is not intended that these quantities be regarded as absolute volume estimates (due to the great uncertainty in ground cross slopes, use of fill material, stability of cut slopes, etc.), they do provide a reasonable relative assessment of the excess earthworks needed for each alternative, *i.e.*, those not simply proportional to route length. These and other relevant data are summarized in Table 1 below.

Figure 3. Existing ground and track profile of rebuilt Alternative D6b (Outer Bypass)



Analysis. The following observations can be made about the values in Table 1, the as-built track profiles shown in Figures 1-3, and the information provided in the Applicant's Comments (the numbers in parentheses in Table 1 give parameter index values relative to Alternative C):

Table 1. Key Parameter Values for Route Alternatives			
	Alt C	Alt D6a	Alt D6b
Total Length, miles	72.7 (100)	98.0 (135)	92.7 (128)
Earthworks "Cut Volume", million cubic yards	29.8 (100)	32.6 (109)	40.1 (135)
Average absolute grade, percent	0.57 (100)	0.67 (118)	0.69 (121)
Major Drainage Crossings	42.1 (100)	41.0 (97)	41.0 (97)

1). The first observation to make is that the grading cost estimate for Alternative C is essentially the "Typical" per-mile cost of \$450,000 over the 72.7 miles, or \$32.715 million. The only additional costs presented in the Applicant's Comments are for 9 miles of Cheyenne River "pinch points" at an additional cost of \$2.025 million [Applicant's Comments, Attachment C, Exhibit D at Est-C], for a total grading cost of \$34.740 million. This results in only a 6.2% increase over the "Typical" costs. This is a very surprising result, given that this area has been avoided for over a century due to its unstable Pierre shale soils. It is simply not credible that grading and earthworks costs in this section of the Cheyenne River valley will be only 106% of "typical" per mile costs.

The section between Smithwick and Wasta along the Alternative C alignment is definitely not typical of the entire new construction route. In fact, the grading along this section is comparable to that of the section of the existing Smithwick to Rapid City route, which the Applicant has strongly suggested is an infeasible alignment (see earthworks "cut volume" estimates in Table 1). Most observers would probably suggest something in the range of 200-300% of normal as a reasonable earthworks cost estimate along the Alternative C route. Including the abnormal costs along this stretch of the Cheyenne River Valley in the calculation of "typical" grading costs would appear to significantly bias the Applicant's Comments against all other alternatives, which would bear these inflated base-rate costs along their entire new alignments.

2). In addition, these Cheyenne River "pinch point" earthworks (see Figure 1 from mileposts 90 to 109) are only a small part (19.7%) of the earthwork volumes that will be needed to meet grade and curvature constraints along the Alternative C alignment. Most of these excess earthworks are needed to climb out of the Cheyenne River drainage, cross the French Creek and Battle Creek drainages, and drop down into the Spring Creek drainage

(see Figure 1 between mileposts 50 to 80). These earthwork estimates are also likely to be underestimated, since they do not consider the unstable soils along this alignment, but rather use the same width-of-cut factor as the rebuilt D6 alternatives. Only engineering design evaluations would provide the cross-fall, cut slope, cut-and-fill balancing, and other important information necessary for an accurate earthworks quantity estimate, but all of these factors are likely to result in greater relative increases in grading quantities along the Alternative C alignment than along the more-stable existing corridor alignments.

3). If the grading costs of Alternative C are considered "reasonable" by the Applicant, then the earthworks estimates for the rebuilt alignments in the existing Smithwick to Wasta corridor must also be realistic, since the "cut volume" estimates are only 9 and 35% higher, as seen in Table 1. Moreover, these cut volumes for the rebuilt D6 alternatives are likely to overestimate the earthworks required, since they do not utilize the cut material to fill in the approaches to the ridges, which could significantly reduce these estimates. The soils along the existing corridor are also more stable, making it less likely that cut and fill slopes will have to be reduced to ensure bank stabilities. In addition, a significant part of these earthworks is due to the bypass at Rapid City (18% for the Inner Bypass and 35% for the Outer Bypass), indicating that the excess earthworks south of Rapid City are equal or less than those for the Alternative C alignment. This hardly supports the assertions that the "grades are too steep", "the curves are too sharp", or that the "Black Hills are in the way."

4). Another observation is that the drainage cost estimate for Alternative C is significantly above the "Typical" per-mile cost of \$400,000 over the 72.7 miles, or \$29.080 million. The Applicant's Comments include costs twice the typical rate over 15 miles along Spring Creek, Battle Creek, and Hay Canyon at an additional cost of \$6.000 million [Applicant's Comments, Attachment C, Exhibit D at Est-C], for a total drainage cost of \$35.080 million. This results in a 21.6% increase over the "Typical" costs. Converting these costs into a "major drainages per mile" figure to compare to the Alternative D routes yields 42.1 major structures along the 72.7 mile route [\$35.080 million divided by the cost per major structure of \$0.833 million (\$400,000 / 0.48)].

5). Both of the existing corridor Alternatives cross 41 major drainages (Applicant's Comments at Attachment C, Exhibit A), resulting in estimated drainage costs of 97% of the Alternative C costs given in 4) above. However, 31 of these 41 major drainages are from a 19th-century alignment that minimized earthworks by following along the Box Elder, Lame Johnny, Beaver and Sand Creek drainages. The opportunity therefore exists for trading-off rebuild grading costs against drainage costs by choosing the most cost effective mix of earthworks and stream crossings along these drainages. Nevertheless, even without these potential cost reductions along the rebuilt existing corridor, as far as major drainage costs go, there is essentially no difference between the Alternative C and rebuilt existing alternatives. This again calls into question the major impacts of the limited number of parameters used in the "back of the envelope" estimates provided by the Applicant, estimates that would again seem to be biased against all the rebuild alternatives.

6). There is no denying that Alternative C is the shortest of the routes, but only very marginally when viewed in the total project context from the PRB to the Mississippi River. Both of the bypass options at Rapid City result in significant length reductions, especially the Outer Bypass, the savings from which (in both construction and future operating costs) will go

a long way towards compensating for the additional earthworks costs. The Outer Bypass avoids Rapid City entirely, and would therefore seem to minimize disruption to existing developments. Moreover, the uncertainties of the actual earthworks costs along the Alternative C route are large. For example, if the grading costs are low by 100% then the Alternative C grading costs would be underestimated by \$35 million. It is possible that the total construction costs will be less for the rebuilt existing corridor even though these alternatives are 20 to 25 miles longer (\$16 to \$20 million at \$0.8 million per mile track costs).

7). Future excess operating costs will include costs proportional to travel time (such as crew payments), and excess fuel costs, which are affected by length and grade. The Inner Bypass (Alt D6a) and the Outer Bypass (Alt D6b) are 25.3 and 20.0 miles longer than Alternative C, respectively, or 35% and 28%. The costs related to travel time will thus also be increased by 35% and 28%. The excess fuel costs will be proportional to excess length, times a correction factor to account for excess rise and fall along the alignment. The average absolute grade (total-rise plus total-fall divided by total-length) gives an indication of the amount of such per-mile increase that may occur across alternative alignments. Since the average absolute grade increases by 18% and 21% over Alternative C for the Inner and Outer Bypass alternatives, these might result in increased per-mile fuel consumption of as much as 9% and 11%, respectively. Since these factors would be compounded with the length increases, the total fuel consumption might increase by 47% and 42% for the Inner and Outer Bypasses, respectively (or converted to effective increased miles, 34 and 30, respectively).

8). When compared to the 810-mile total project route, the increased time and fuel costs can be understood to be of at most 1% to 2% of trip costs. The mileage increases of the rebuilt D6 alternatives (25 and 20 miles) are only 3% of trip length, while the effective fuel cost increases (34 and 30 miles) are only 4% of trip length. Even if fuel and crew costs comprise one third to one half of total operating costs, these excess costs will still be only 1% to 2% of total trip operating costs from the PRB to the Mississippi.

9). The increases in trip costs associated with the additional miles along the rebuilt existing route must be compared against the likely costs from interruption of service along the Alternative C route caused by significant landslides or slumping banks. A 1% to 2% disruption of service would translate to 3 to 6 months of shutdown over 25 years. If a major slide event would close the entire operation for many months, the 1% to 2% extra operating costs to avoid the unstable soils along Alternative C would appear to be a wise business investment in ensuring reliable operations and service.

Reasonable Alternatives. Finally, I must say a word about the interpretation of "reasonable" alternatives. The Applicant miscasts the application as simply a private party request, without recognizing that the Federal agency is, in effect, acquiring the project site for the Applicant by its decision to approve an alignment. Contrary to the Applicant's misinterpretation of the Burlington decision [Applicant's comments at 3], this puts the decision fully back within the realm where the Federal government "acts as proprietor" and where the "scope of alternatives ... is wide ranging and comprehensive." In addition, the Applicant fails to include in its Comments other basic rulings on this issue, particularly that:

We have held before that an agency bears the responsibility for deciding which alternatives to consider in an environmental impact statement. See *North Slope Borough v. Andrus*, 642 F.2d

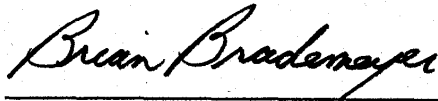
589, 601 (D.C.Cir.1980). We have also held that an agency need follow only a "rule of reason" in preparing an EIS, see *Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 837 (D.C.Cir.1972), and that this rule of reason governs "both *which* alternatives the agency must discuss and the *extent* to which it must discuss them," *Alaska v. Andrus*, 580 F.2d at 475; see *Allison v. Department of Transp.*, 908 F.2d 1024, 1031 (D.C.Cir.1990). It follows that the agency thus bears the responsibility for defining at the outset the objectives of an action. See *City of Angoon v. Hodel*, 803 F.2d at 1021; cf. 40 C.F.R. 1502.13. [*Burlington, Inc. et al. vs. Busey, et al.*, 938 F.2d 190 at 195, 196 (1991), italics original, underlining added.]

Thus, it is not for DM&E to declare that the analysis for rebuilding the existing corridor between Smithwick and Wasta (with an obviously needed bypass at Rapid City) is "a waste of resources." [Applicant's Comments at 6]. Rather, the agency must determine whether, in fact, given the "Purpose and Need Summary" presented again by the Applicant on pp. 4-5, the Applicant's stated needs wouldn't be better served by rebuilding the existing alignment, rather than by abandoning service to Rapid City (no costs for the rebuild of the 40-mile westbound spur line or the 65-mile southbound spur line are presented by the Applicant, once again biasing their analysis) and risking periodic major disruption to customers due to landslides and shifting unstable soils along the Cheyenne River alignment of Alternative C (or Alternative B, for that matter).

I've been to this area and have seen firsthand these slumping bluffs and unstable slopes. If anything, it is the Alternative C alignment that is "unreasonable" from a NEPA sense. That this alignment would also lead to the inexorable abandonment of service to Rapid City conflicts with the stated first, fifth and seventh stated purposes and needs of the project [Applicant's Comments at 4-5]. The likelihood of major service interruptions due to landslides along the Cheyenne River corridor conflicts with the second and fourth stated purposes and needs of the project [*Id.* at 4], since efficient coal delivery and electricity cost stability can hardly be enhanced by providing an inherently unreliable service system.

The Federal agencies involved in this project approval simply must protect the public interest and avoid speculative and unreliable projections of rosy outcomes. The Federal agencies must save DM&E from its own folly, and deny approval of any alternative that optimistically projects grading costs over unstable Pierre Shale soils to be only 106% of normal earthworks costs. There is a common-sense reason why no major transportation infrastructure exists along the Alternative C alignment between Smithwick and Wasta: it can't be built at anywhere near "typical" per-mile costs.

Sincerely,



Brian Brademeyer

cc: Wendy Schmitzer, US Forest Service
Jerry Folkers, US Army Corps of Engineers
Senator Tom Daschle
Senator Tim Johnson
Governor Bill Janklow

Attachment 2 -- Scoping Letter of October 9, 1999
(mistakenly dated as September 9, 1999)

September 9, 1999
PO Box 762
Rapid City, SD 57709
(605) 348-8404

Office of the Secretary
Case Control Unit
STB Finance Docket No. 33407
Surface Transportation Board
1925 K Street, N.W.
Washington, DC 20423-0001

ATTENTION: Ms. Elaine K. Kaiser
Chief, Section of Environmental Analysis
Environmental Filing

RE: COMMENTS ON APPLICANT'S ALTERNATIVE ROUTES ANALYSIS
Additional Comments on "Wall Hill" Alternatives

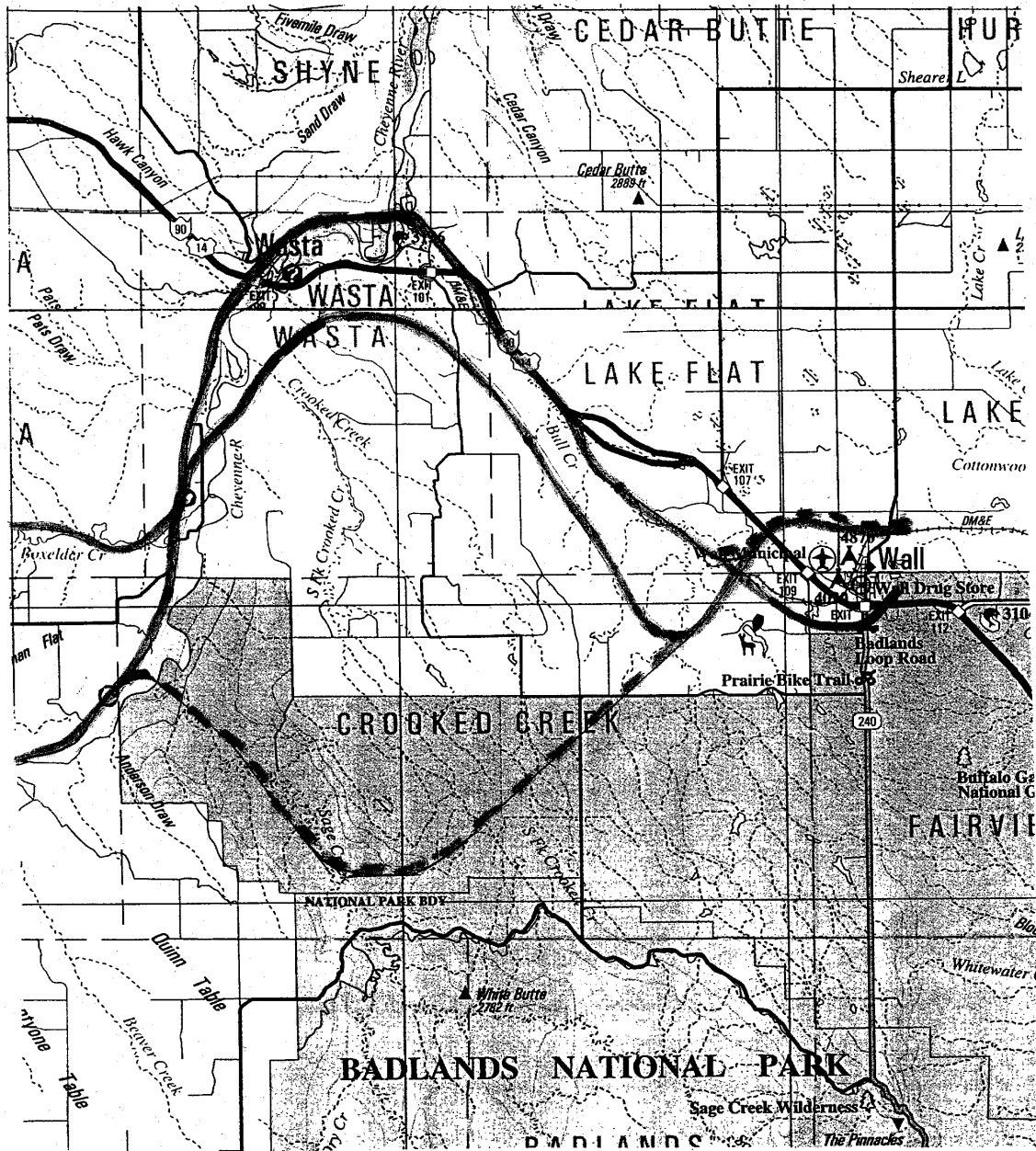
Dear Ms. Kaiser:

I am writing to call your attention to additional deficiencies in the "Dakota, Minnesota and Eastern Railroad -- Applicant Comments on Alternative Routes Analysis" dated June 9, 1999. These comments are in addition to those in my August 8, 1999, letter to you on this same DM&E document.

To briefly repeat my qualifications to make these comments: I am a trained Civil Engineer with Bachelor's and Master's Degrees in Civil Engineering from the Massachusetts Institute of Technology. My professional background includes 15 years as a Research Engineer in MIT's Transportation Systems Division, where I specialized in transportation and highway needs of developing countries. I have also analyzed railroad construction, maintenance and operations in Africa, Europe, and North America.

DM&E has failed to meaningfully respond to the federal agencies explicit requests regarding analysis of their existing corridor, including the "Wall Hill" climb out of the Cheyenne River Valley beginning near Wasta and ending at Wall, SD. Therefore, I have myself undertaken to determine what level of earthworks would be required to upgrade the existing alignment between Wasta and Wall, SD. Alternatives that bypass Wall to the west and south are explored (the existing route through Wall contains too sharp of curves to meet the proposed engineering constraints). I then compare these earthworks and other construction parameters to the proposed DM&E Alternative C, which applicants assert is "reasonable" [Applicant Comments at 7]. Additionally, I explore the possibility of a route that leaves the Cheyenne River Valley at Sage Creek and then climbs this drainage out of the river valley and crosses the plateau to Wall. These various alternative alignments are shown in Figure 1.

Figure 1. Alternative Routes for Climbing the "Wall Hill", Wasta to Wall, SD.



DM&E's proposed Alternative C is shown in red. The rebuild Alternative D6S which follows along the Bull Creek alignment is shown in blue. The rebuild Alternative D6W shown in dashed-blue joins the Alt C alignment after it crosses Bull Creek. The Sage Creek Alternative C1 is shown in dashed red from the Cheyenne River until it joins the Alt C alignment at its southern "recurve" point.

The earthworks calculations show that both rebuilds of this section from Wasta to Wall (with a bypass either to the west or south of Wall) can meet the geometric constraints of 1% maximum grades and 1 degree maximum curvature at reasonable cost, i.e., with less earthworks than for DM&E's proposed Alternative C. Once again, the rebuild options on the existing route are in fact reasonable alternatives under the terms of the National Environmental Policy Act (NEPA) and must be analyzed at the same level of detail as all other NEPA alternatives in the Environmental Impact Statement.

Methodology. With the use of USGS 7.5' topographic maps, I was able to lay out the alignment of Alternative C from where it rejoins the existing line just north of the confluence of the Cheyenne River with Box Elder Creek, south of Wasta, SD (westbound milepost 609.0) to where it rejoins the existing line just north of Wall (milepost not provided in Applicants data attachments). A route was laid out on these maps using arcs of 0.95 degree curvature and tangent sections between the arcs. Ruler and protractor were used to lay out the mileposts along this route, and elevations were taken from the topo maps. The maximum 1% grade constraint (taken as 50 ft/mile) was used to determine the constructed profile of the track along this route.

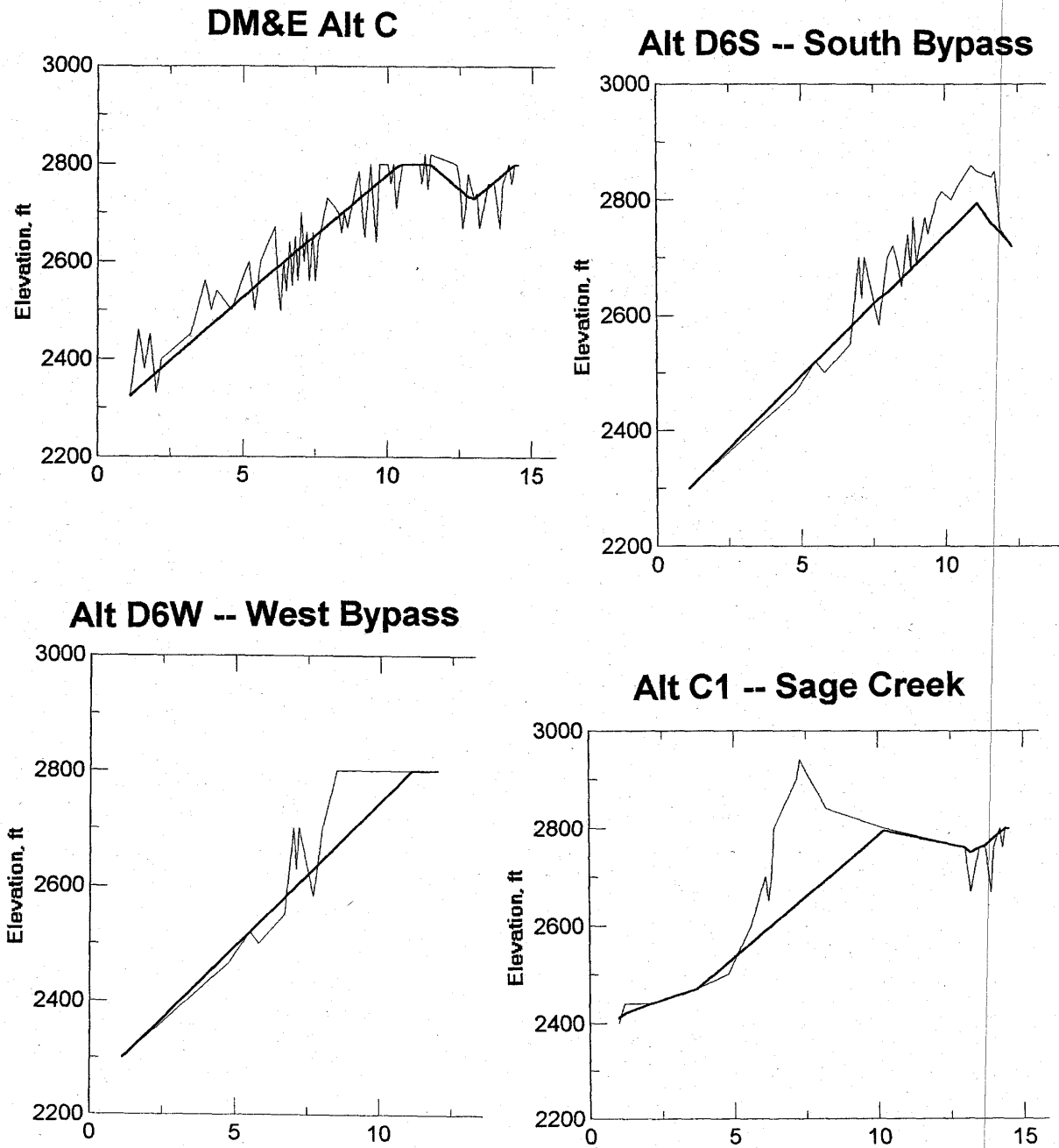
The same topographic maps were used to determine the geometric realignment needed along the existing route between Wasta and Wall. Ruler and protractor were used to lay out the mileposts along this route, and elevations were taken from the topo maps. All curves were reduced to no more than 0.95 degree of curvature. The existing curve into Wall is too sharp to realign, so a bypass to the south of Wall was developed, crossing under the Interstate 90 embankment for Exit 110 just to the east of the "wall". This alignment would then have a flat shot into Quinn, but would need a short spur back into Wall. The mileage estimate for this alternative, which is referred to as Alternative D6S (for south), is based on achieving the same distance west of Quinn as the other alternatives that rejoin the existing track north of Wall, SD.

An additional rebuild route was developed that follows the existing (rebuilt) alignment as in Alt D6S, but that rejoins the Alt C alignment when it crosses the existing track in the upper reaches of the Bull Creek drainage (about where Alt C crosses Interstate 90 between Exits 107 and 109. However, this alternative is at significantly lower elevation and still climbing during this stretch, passing under the Interstate in a cut 80-90 feet deep. This alignment would probably require a tunnel, at least where it crosses under I-90.

A final route that has been mentioned in the local media is to use the Sage Creek drainage to leave the Cheyenne River Valley. This alignment is comparable in length to the other alternatives, but has major earthworks in exiting the Sage Creek drainage, where it meets a 300-350 foot rise in a little over a mile at the headwaters of Sage Creek or its tributaries. The selected alignment on this route avoids Badlands National Park, but only barely, passing within 1/2 mile to the north of the Park.

The resulting ground and track profiles for these various alternative routes for climbing the "Wall Hill" are shown in Figure 2. Since these routes do not all originate from the same point, or terminate at the same point, the profiles are shown only for the "climb" portions of each route. In all cases, the horizontal axis is in miles.

Figure 2. Ground and Track Profiles of the "Wall Hill" Alternatives



Earthworks. As in my comments of August 8, 1999, the quantity of earthworks was estimated from the height of the "cuts" needed to meet grade restrictions, weighted by the average of the forward and rearward segment lengths from the as-constructed profile estimates, times an "effective" cut width (taken as 40 yards for this analysis). This resulted in an earthworks "cut volume" index, measured in millions of cubic yards, that can be used to compare the relative grading requirements of the Alternative routes. While it is not intended that these quantities be regarded as absolute volume estimates (due to the great uncertainty in ground cross slopes, use of fill material, stability of cut slopes, etc.), they do provide a reasonable relative assessment of the excess earthworks needed for each alternative, *i.e.*, those not simply proportional to route length. These and other relevant data are summarized in Table 1 below (the numbers in parentheses give earthworks index values relative to Alternative C, which is assigned as index value of 100).

Table 1. Earthworks "Cut Volumes"				
	Alt C	Alt D6S	Alt D6W	Alt C1
Earthworks "Cut Volume" (million cubic yards)	9.0 (100)	7.0 (77)	6.9 (76)	15.5 (172)

Analysis. The following observations can be made about the values in Table 1, the as-built track profiles shown in Figure 2, and the information provided in the Applicant's Comments.

1). The first observation to make is that the grading earthworks estimate for Alternative C is likely to be significantly underestimated, since this alignment parallels the contour lines along much of the climb out of the Cheyenne River Valley, meaning that it crosses all of the minor drainages and tributaries feeding Bull Creek from the south. This results in cross-slopes of 50-100% and more. In addition, these Pierre shale hills are extremely unstable, further complicating any large-scale construction that does not follow perpendicular to the contours. Most observers would probably suggest something in the range of 200-300% of normal as a reasonable earthworks cost estimate along this portion of the Alternative C route, meaning that the DM&E preferred Alternative C might have by far the highest earthworks quantities of any of the four alignments analyzed, even greater than the Sage Creek Alternative (C1).

Of even more importance, it is unlikely that the proposed Alternative C alignment will remain stable long enough to be operational as a heavy-haul rail bed. The alignment crosses numerous areas of slumping and unstable soils, including the many springs along the five miles or more of the "Jensen Hill" portion of the route. I have visited this area with the ranch owner, and have seen huge slumping areas on these side hills, including actively slumping areas that are still draining water out of the shale banks. This area will become even more unstable if it is disturbed by major construction equipment.

2). If the grading costs of Alternative C are considered "reasonable" by the Applicant, then the earthworks estimates for the rebuilt D6S and D6W alignments in the existing Wasta to Wall corridor must also be realistic, since the "cut volume" estimates are 23 and 24% lower, as seen in Table 1. Moreover, these cut volumes for the rebuilt D6 alternatives are likely to overestimate the earthworks required, since they do not utilize the cut material to fill in the approaches to the cuts, which could significantly reduce these estimates. The soils along the existing corridor are also more stable, making it less likely that cut and fill slopes will have to be reduced to ensure bank stabilities.

The South Bypass follows the existing alignment up the Bull Creek drainage as far as it can, but then must curve southward to avoid Wall, since the curvature constraints cannot be met by passing through downtown Wall. The South Bypass passes 55 feet under the Badlands Loop Road, and then cuts through the "wall" at the embankment that raises Interstate 90 upwards towards Exit 110. The alignment ends at an equal distance (about 4.6 miles) west of Quinn as the other alternatives, but a new alignment will be needed over the flats east of Wall. A two-mile tunnel near the summit of this alignment might mitigate the visual disruptions to the badlands "wall" area.

The West Bypass at Wall will require a tunnel to pass under Interstate 90, or to minimize the disruption from the major cut needed to break through the "wall" west of Wall. This cut reaches 130 feet at its greatest depth, but reduces to 80-90 feet as it passes under the Interstate. The tunnel would be less than three miles in length.

3). Thirdly, the Sage Creek alignment would require a four-mile tunnel to break out of the Sage Creek drainage. While this is the shortest alignment, it would increase the air pollution experienced by Badlands National Park, since the trains would be under load as they pass within 1/2 mile of the Park. In addition, this alignment would impact the most public lands, since it would pass through the Buffalo Gap National Grasslands for several miles. However, this alignment would not encounter the unstable soils problems to such an extent as the proposed Alternative C alignment, since it would follow the drainage rather than rising on side hills.

4). While the earthworks associated with the Wall Hills are significant, they represent a small portion of the earthworks (15% for the rebuild alternatives, 23% for Alternative C) that will be necessary for any construction or reconstruction between Smithwick and Wall. The scale of the necessary cuts and fills (ignoring cross slopes that are prevalent only on Alternative C) can be seen in Figures 3-6 below, which shows the ground and track profiles for the entire route from Smithwick, SD to Wall, SD. From these figures, it can be readily seen that much of the earthwork requirements are due to exiting the Cheyenne River Valley, and for the Rapid City bypasses crossing between the Rapid Creek and Box Elder Creek drainages.

For your convenience, I have updated the statistics for the entire routes from those values given in my August 8, 1999 comments, and present them in Table 2 below. Since all of the "wall hill" alternatives analyzed in my current comments do not have the same end points, I also append the complete profiles for all four alternatives from Smithwick to Wall (see Figures 3-6 below). For completeness, I have also attached a map of the Inner and Outer Rapid City Bypasses (see Figure 7 below). For the rebuilt alternatives, I have used the preferable Outer Bypass option at Rapid City, which has the highest earthworks for the existing corridor options but also the shortest length.

Table 2. Key Parameter Values for Route Alternatives

	<u>Alt C</u>	<u>Alt D6S</u>	<u>Alt D6W</u>	<u>Alt C1</u>
Total Length, miles Smithwick to Wall, SD	90.7 (100)	113.2 (125)	112.5 (124)	87.7 (97)
Earthworks "Cut Volume" (million cubic yards)	38.8 (100)	47.1 (121)	47.0 (121)	43.4 (112)

5). And finally, as I pointed out in my August 8, 1999, comments, the increases in trip costs associated with the additional miles along the rebuilt existing route must be compared against the likely costs from interruption of service along the Alternative C route caused by significant landslides or slumping banks. A 1% to 2% disruption of service would translate to 3 to 6 months of shutdown over 25 years. If a major slide event would close the entire operation for many months, the 1% to 2% extra operating costs to avoid the unstable soils along Alternative C would appear to be a wise business investment in ensuring reliable operations and service.

* * * * *

The amount of earthworks necessary to exit the Cheyenne River Valley, and the unstable Pierre shale and badlands areas that are encountered along much of the proposed Alternative C alignment between Smithwick and Wall, SD, raise the question of whether it is desirable to enter the Cheyenne River Valley at all, just from an engineering cost perspective, let alone from an environmental impact perspective. The Surface Transportation Board may wish to ask DM&E why it cannot follow the existing BNSF or UP corridors into Nebraska or North Dakota instead of crossing western South Dakota.

Sincerely,



Brian Brademeyer

cc: Wendy Schmitzer, US Forest Service
Jerry Folkers, US Army Corps of Engineers
Senator Tom Daschle
Senator Tim Johnson
Governor Bill Janklow

Figure 3. Existing ground and track profile of DM&E Alternative C -- Smithwick to Wall

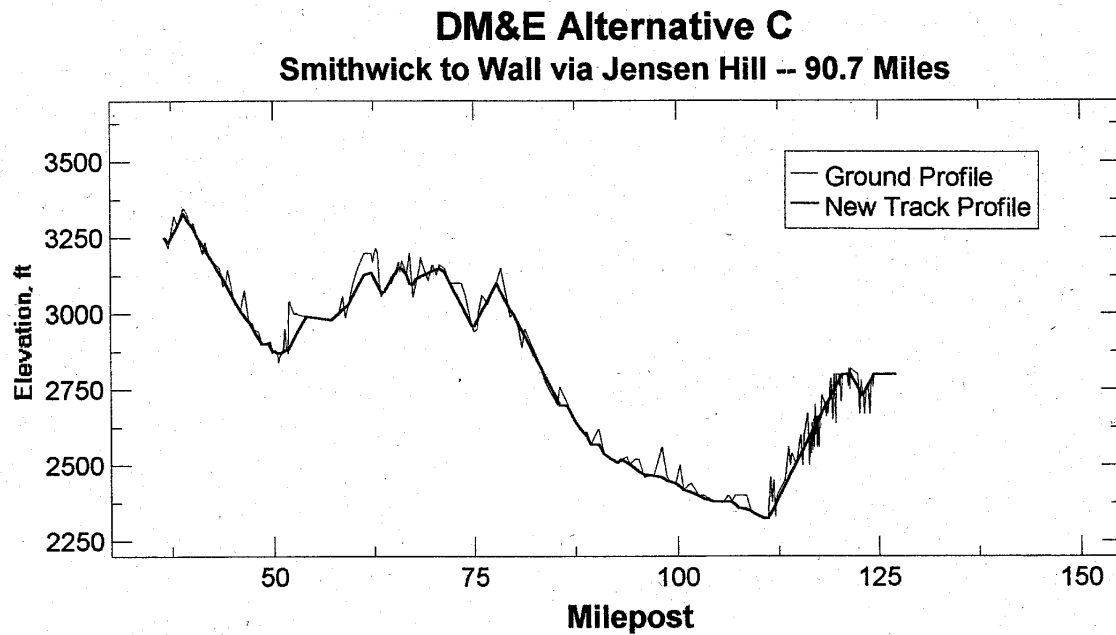


Figure 4. Existing ground and track profile of Alternative D6S -- South Bypass at Wall

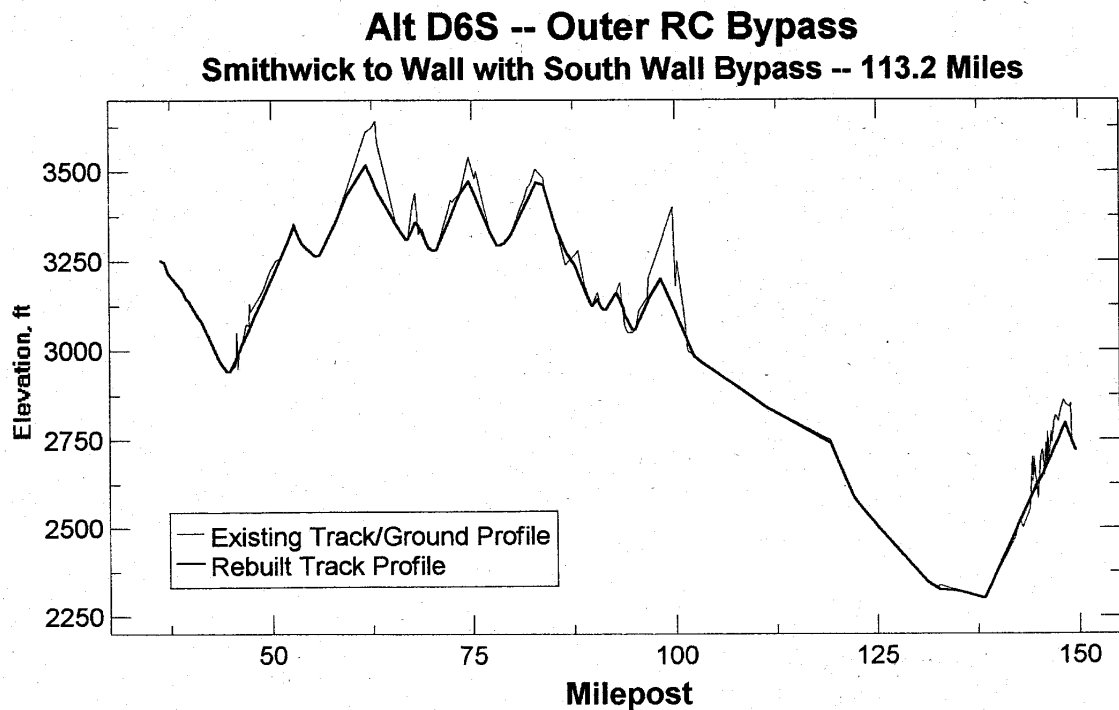


Figure 5. Existing ground and track profile of Alternative D6W -- West Bypass at Wall

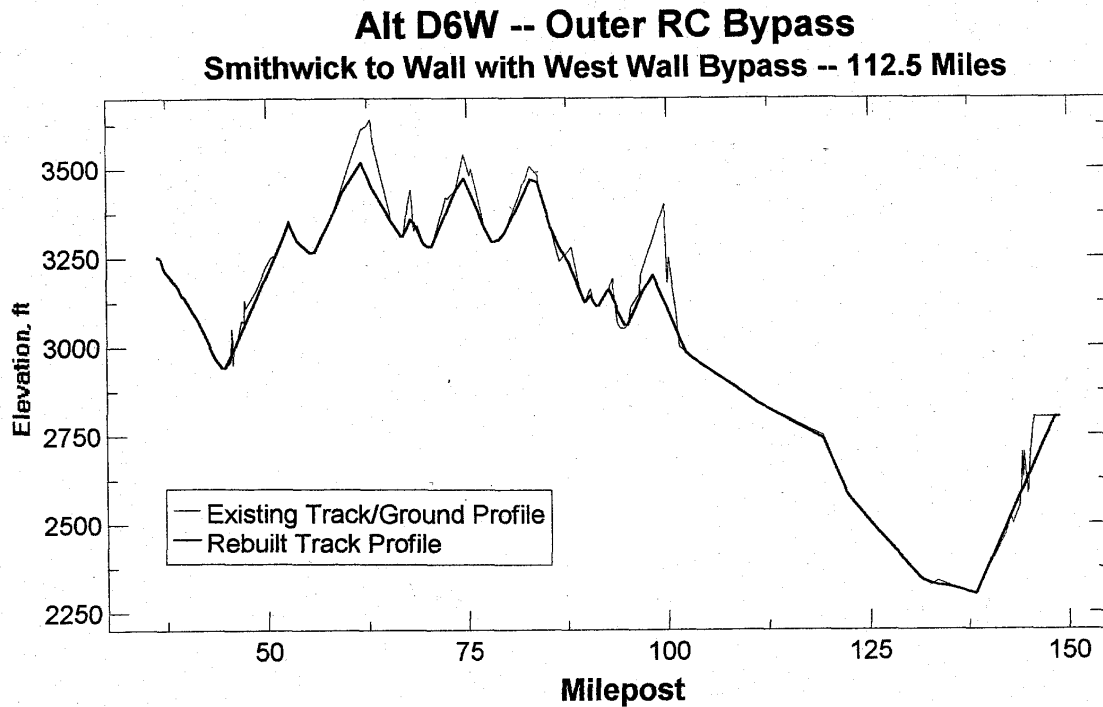


Figure 6. Existing ground and track profile of Alternative C1 -- Sage Creek Route

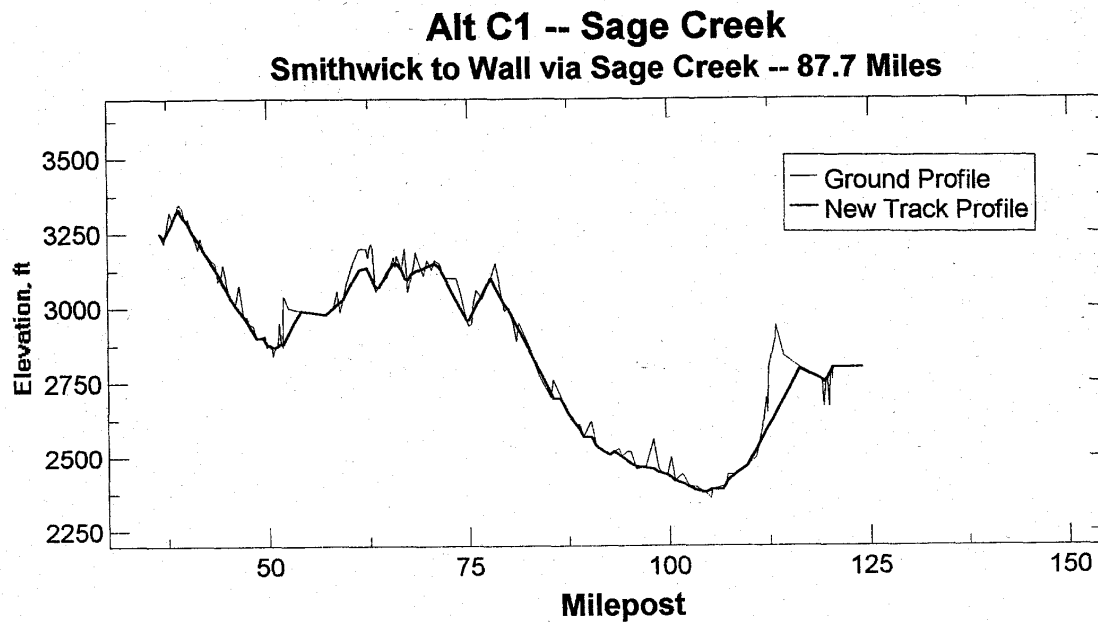
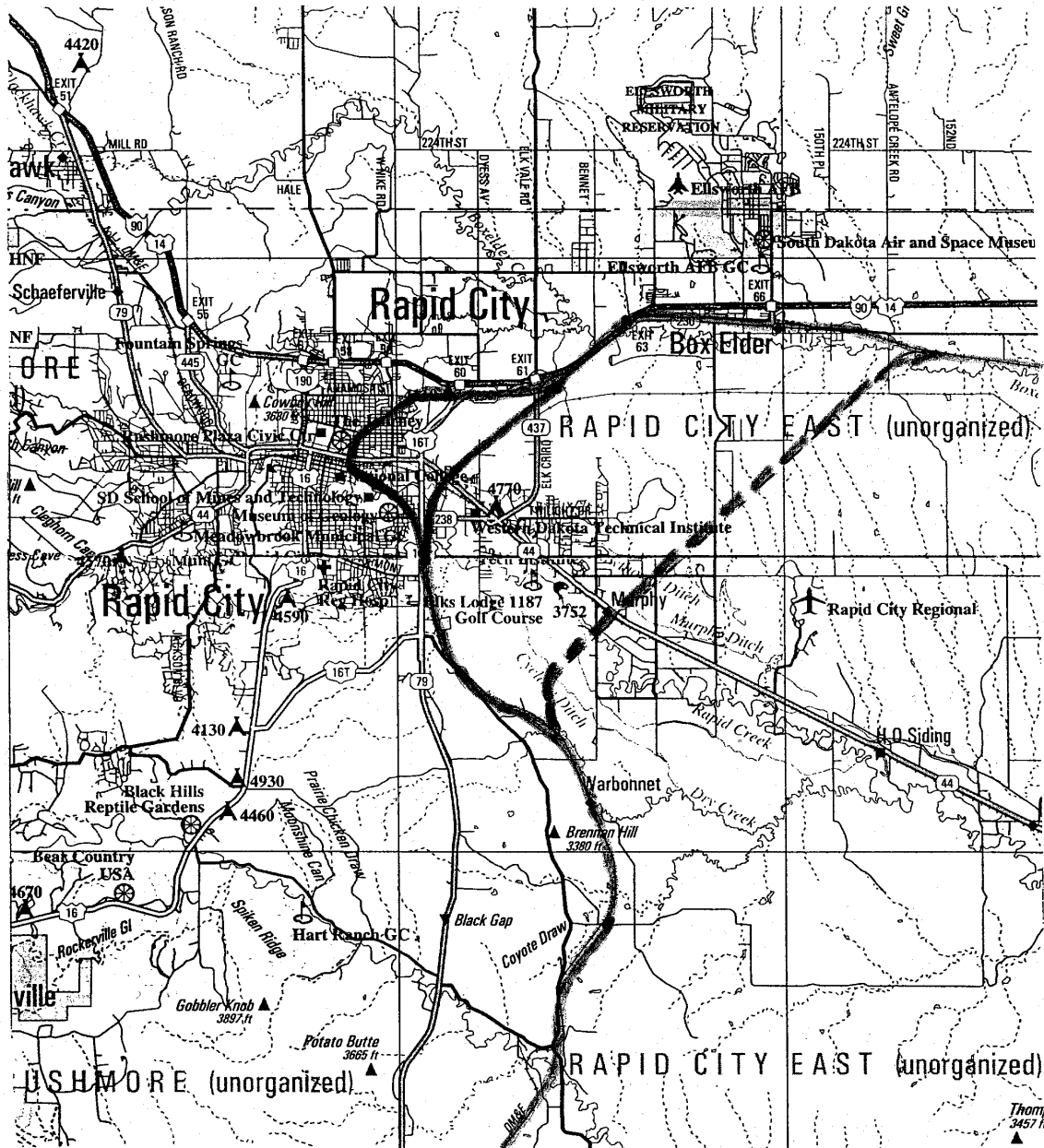


Figure 7. Inner and Outer Bypass Alignments at Rapid City



The existing route cannot be rebuilt within downtown Rapid City due to curvature and grade constraints. A proposed Inner Bypass alignment is shown here in red, with the Outer Bypass shown in dashed red.

Attachment 3 -- Oral Comments of November 2, 2000

November 2, 2000
PO Box 762
Rapid City, SD 57709
(605) 348-8404

Office of the Secretary
Case Control Unit
STB Finance Docket No. 33407
Surface Transportation Board
1925 K Street, N.W.
Washington, DC 20423-0001

ATTENTION: Ms. Elaine K. Kaiser
Chief, Section of Environmental Analysis
Environmental Filing

Re: Oral Comments on PRB Expansion DEIS
Presented to Federal Agencies at the Rapid City DEIS Hearing

Dear Ms. Kaiser:

I am a trained Civil Engineer with Bachelor's and Master's Degrees in Civil Engineering from the Massachusetts Institute of Technology. My professional background includes 15 years as a Research Engineer in MIT's Transportation Systems Division, where I specialized in transportation and highway needs of developing countries. I have also analyzed railroad construction, maintenance and operations in Africa, Europe, and North America.

In my August 8, 1999, letter to STB, I pointed out the serious flaws in the Applicant's dismissal of using existing corridors between Wasta, SD, and Smithwick, SD, in order to avoid the unstable Pierre shale formations within the Cheyenne River valley. The DEIS continues to give inadequate attention to this alternative. In that analysis, I compared earthworks and other construction parameters along a reasonably rebuilt existing corridor to the proposed DM&E Alternative C. These calculations show that a rebuild of this section (with a bypass at Rapid City) can meet the geometric constraints of 1% maximum grades and 1 degree maximum curvature at reasonable cost, *i.e.*, that this "obvious" route is in fact a reasonable alternative under the terms of the National Environmental Policy Act (NEPA) and must be analyzed at the same level of detail as all other NEPA alternatives in the Environmental Impact Statement. In the Final EIS, the increases in trip costs associated with the additional miles along the rebuilt existing route must be compared against the likely costs from interruption of service along the Alternative C route caused by significant landslides or slumping banks.

In my October 9, 1999 letter to STB (mistakenly dated as September 9, 1999) I pointed out that DM&E has failed to meaningfully respond to the federal agencies explicit

requests regarding analysis of their existing corridor, including the "Wall Hill" climb out of the Cheyenne River Valley beginning near Wasta and ending at Wall, SD. The DEIS continues this non-analysis: "This realignment of the existing system was determined the only practical and feasible solution to the operational problems at Wall, considering the Cheyenne River, engineering requirements to cross Interstate 90, and straighten the overall segment." [DEIS at 2-16, footnote 7]. In my own analysis of the Wall Hill proposal, I found that the amount of earthworks necessary to exit the Cheyenne River Valley, and the unstable Pierre shale and badlands areas that are encountered along much of the proposed Alternative C alignment between Smithwick and Wall, SD, raise the question of whether it is desirable to enter the Cheyenne River Valley at all, just from an engineering cost perspective, let alone from an environmental impact perspective. These concerns must be fully addressed in the Final EIS.

In short, I have already pointed out to the STB that the Applicant's alternatives B and C within the Cheyenne River Valley, using the Applicant's proposed engineering constraints of 1 percent maximum grade and 1 degree maximum curvature, provides little transportation benefit over using the existing corridor between Wasta and Smithwick. Environmentally, staying out of the Cheyenne River Valley is definitely preferable. I have also pointed out that those same constraints preclude leaving the Cheyenne River Valley and climbing the Wall Hill without a considerable amount of tunneling. Rather than being the "only practical and feasible solution," the alignment proposed by the Applicant is infeasible under any meaningful consideration of environmental impacts. These two alternatives appear to be little more than "lines on a map" drawn to satisfy *pro forma* application requirements, rather than serious transportation proposals.

In order to investigate further why this application appears to be so nonsensical to so many people, let us look directly at the scenario that DM&E is suggesting will occur. I have tried to capture the essential transportation aspects in Figure 1 below, which shows in very rough schematic terms an annual demand to transport 400 million tons of coal from the Powder River Basin to midwestern utilities. At present, roughly 300 million tons per year is transported by the existing railroad facilities of BNSF and UP by roughly 120 trains per day, loaded plus unloaded. The Applicant proposes construction and reconstruction of a new heavy-haul rail line to carry an additional 100 million tons per year (or roughly a one-third expansion of capacity), on roughly 40 trains per day, loaded plus unloaded, at a preliminary construction cost of around \$1,400 million [STB 12/10/98 Transportation Decision at 40-41]. The Applicant presents no countermeasures that would be taken by BNSF or UP to protect their existing market shares.

This is an extremely unlikely scenario from a transportation standpoint, since the major factor affecting capacity of a unit-train system is the transportation "effectiveness" of the backhaul portion. The Applicant presumes that three firms will continue to operate two-way flow systems, with each empty train consuming capacity that could be used for additional loaded traffic. [Loaded train flows are shown by the dark arrows and empty train flows by the light arrows in Figure 1.] If empty backhauls could be moved to other tracks, the coal hauling capacity of the transport system would be effectively doubled.

This is much more likely to occur than the scenario proposed by the Applicant, and is shown schematically in Figure 2 below.

For comparison purposes, Figure 2 retains an overall transport demand of 400 million tons per year of PRB coal, but focuses on the equally important usage of the 3 million empty coal cars per year that are "produced" at the midwestern utilities by the process of transporting this coal. From a transportation standpoint, the "capacity" of BNSF and UP facilities can be doubled by having the empty coal cars and locomotives returned to the PRB by a one-directional flow over the Applicant's new rail line. All of the loaded trains would flow eastward over BNSF or UP mainlines, and all of the empty trains would return westward over the Applicant's new (light-rail) line. The total flows on BNSF and UP would be reduced from a total of 120 trains per day (loaded plus unloaded) to 80 trains per day (loaded only). The Applicant's projected flows would double from 40 trains per day (loaded plus unloaded) to 80 trains per day (unloaded only).

This second scenario is much more likely from a transportation standpoint, for the following reasons. First, the capacity of BNSF and UP could be increased by 50% and still meet the congestion levels experienced by the current mixed-flow regime, effectively raising PRB coal capacity to 600 million tons per year, without any additional investments by BNSF or UP. Second, the construction costs could be considerably reduced, since only a light-rail system would be needed (loaded coal cars weigh ten times or more than empty cars weigh). Thus, engineering constraints could also be relaxed, easily to 2 percent grades and 2 degrees of curvature, thereby eliminating many of the environmental impacts from the construction and reconstruction activities. Applicant's engineering objections to using the existing corridors between Wall and Smithwick would disappear, as would the construction problem on the "Wall Hill". A bypass a Pierre might also become feasible under these relaxed engineering constraints.

Using the per mile figures for "track rehabilitation" (\$457,000 per mile) and "bridge rehabilitation" (\$198,000 per mile) from the Transportation Decision [p. 41] and 15 percent engineering and contingency yields a "rebuild" cost of \$750,000 per mile. Increasing this figure by one-third for new construction would yield \$1 million per mile. [Note that these were the Applicant's figures for heavy-haul rebuild costs, and thus likely overestimate what would actually be needed]. Using 660 miles of reconstruction and 200 miles of new construction then yields a total cost of just under \$700 million for the one-way "light-rail" project construction costs.

From these figures, we can see that the "capacity" of the system could be increased by 300 million tons per year, as opposed to the Applicant's anticipated 100 million tons, and at half the cost, by rationalizing the PRB transport system to utilize a "loop" of one-way flows. It is my professional opinion that these overwhelming market efficiencies will override any preliminary proposal submitted by the Applicant, and the system will ultimately be operated in this "flow separated" manner. This doubled capacity of the PRB transport system goes a long way to explaining the deafening silence of the Applicant's alleged rail "competitors" for the PRB market.

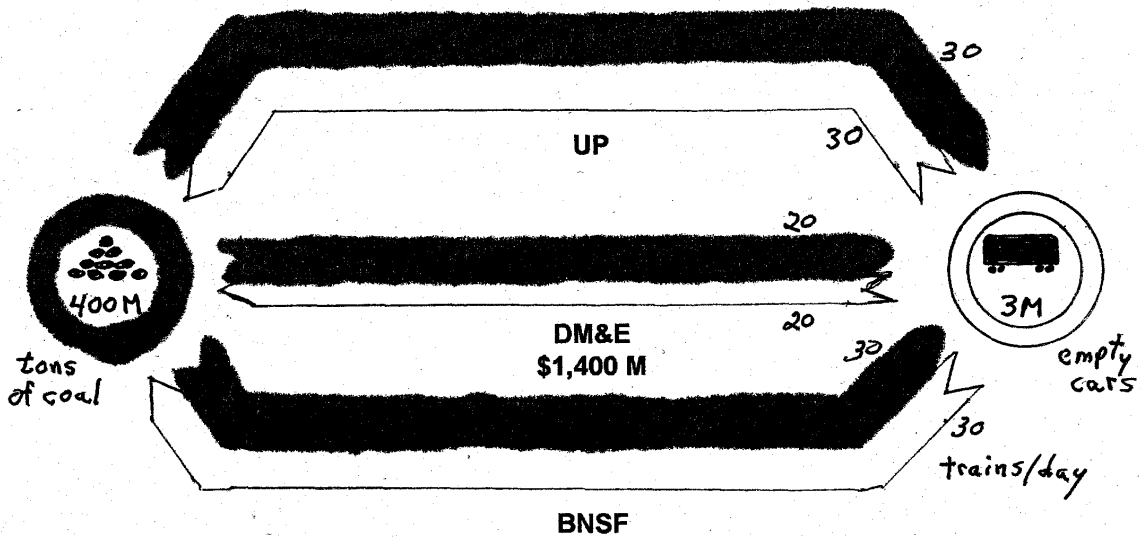


Figure 1. The Applicant's scenario envisions DM&E ultimately achieving a 25% market share for PRB coal, handling about 100 million tons per year out of the total shipment of 400 million tons, at a projected construction cost of \$1,400 million. The railroads would operate exclusionary lines, with each line mixing loaded and unloaded trains moving in opposite directions, exacerbating congestion effects. Solid arrows indicate loaded flows; light arrows indicate unloaded flows.

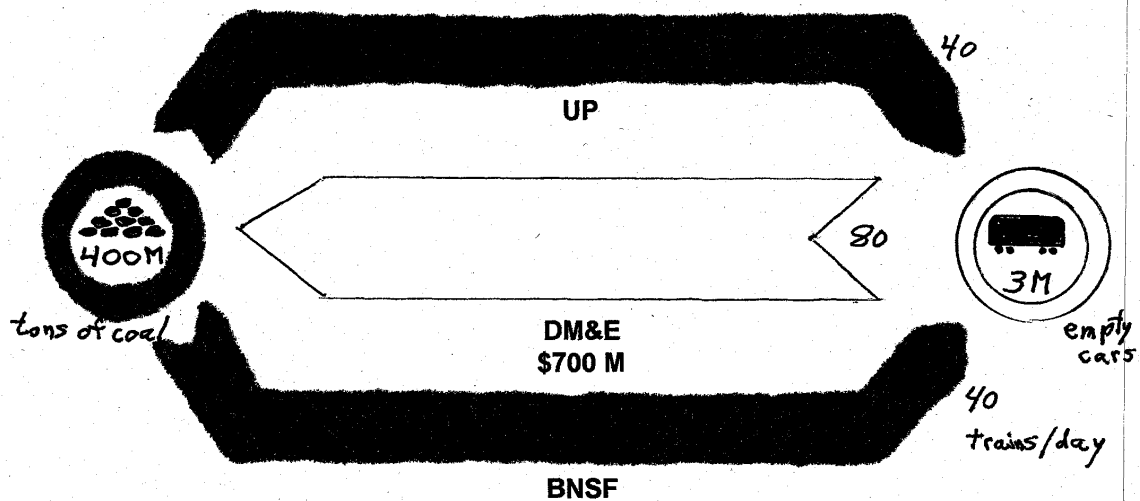


Figure 2. In a "separated flows" scenario, the DM&E track will be used to haul the empty coal trains back to the PRB mines for reloading, minimizing congestion impacts on the BNSF and UP mainline tracks. All loaded flows would be over the heavy-haul BNSF and UP mainlines. An increase in PRB capacity to 600 million tons per year could be achieved by using the "freed-up" mainline capacity for additional coal haulage, at a construction cost of under \$700 million. Solid arrows indicate loaded flows; light arrows indicate unloaded flows.

So why hasn't the Applicant proposed such a transportation alternative? There are at least three reasons. First, given the objections from impacted parties due to noise, vibration, and disturbance from the Applicant's proposed ultimate traffic level of 40 trains per day, those objections would be even louder at the prospect of 80 to 120 trains per day, even unloaded trains. Second, it is highly unlikely that Federal agency permits to cross public lands and waters would be forthcoming in what would be perceived as a highly inequitable balancing of the negative impacts of these coal-related flows (BNSF and UP get enhanced capacity and revenues, those along the Applicant's route get the penalties). And third and possibly most important, your own December 10, 1998, Transportation Decision could never have been issued to a system that would so clearly eliminate the existing users of the Applicant's decrepit railroad.

Given that the "separated flows" scenario achieves greater expansion of PRB capacity, and at lower cost, than the Applicant's proposed scenario, it must be regarded as a reasonably foreseeable operational outcome of granting this application in any form. The costs of construction and environmental impacts must be compared to expanding the BNSF and UP facilities to achieve a similar overall increase in effective PRB capacity. The increased noise and disturbance impacts of 80-120 trains per day must be addressed. The engineering feasibility of using existing corridors must be re-evaluated under a "light-rail" scenario sufficient to accomodate unloaded coal trains, such as 2 percent grades and 2 degrees of curvature. And the environmental justice implications, and likelihood of nasty materials such as garbage and toxics being attracted to these empty west-bound flows, must also be included in the Final EIS.

Sincerely,

A handwritten signature in cursive script, reading "Brian Brademeyer". The signature is written in dark ink and is positioned above a horizontal line.

Brian Brademeyer