



TO: Tim Reardon, Director

FROM: Mike Murphy, Bridge Bureau *MM*
Dan Kiely, Motor Carrier Services
Valerie Wilson, Legal Counsel *VW*

DATE: September 16, 2011

RE: Response to Questions from the Revenue & Transportation Committee

Tim, per your request, please find MDT's response to questions presented by Senator Erickson at the June 2011 Revenue and Transportation Committee meeting concerning MDT's bridge analysis related to the Kearn Module Transportation Plan (KMTP). For clarification, MDT staff reviewed video from the hearing. According to Senator Erickson, the questions and comments inserted in these questions were from "a person with engineering background and concern." Senator Erickson did not disclose the name or credentials of the source.

Question No. 1: Was MDT Bridge Engineer given the same 14 truck configurations to analyze that IDT Bridge Engineer Shanon Murgoitio was given?

Comments inserted within Question No. 1: Attached are two documents that show that IDT analyzed differing truck configurations than MDT did – at least as far as records obtained from each by FOIA requests in each state. As you can see, the IDT document contains 14 trucks and the MDT documentation only shows 1 truck, with reference to 3 others. A number of the trucks evaluated by IDT are larger than the single truck identified by MDT as being the worst case. Since it's safe to conclude that any KMTP truck permitted in Idaho would need to be permitted in Montana as well, it is important that each state permitting agency be looking at the exact same information.

MDT's Response to Question No. 1: On January 27, 2010, MDT's Bridge Management Section received 12 trailer configurations from Imperial Oil for review. MDT analyzed the information, including maximum load effects to the structures based upon axle spacing, axle configuration and individual axle load. On February 11, 2010, MDT provided Imperial Oil with allowable weights for the configurations. On March 2, 2010, Imperial Oil submitted a single configuration in Appendix 7 of the KMTP Transportation Plan, Revision K. While the configuration matched one of the 12 MDT analyzed (the 12 line 16' wide Goldhoffer); the weights submitted on that configuration were heavier than the allowable weight identified by MDT by 13,760 lbs. Dwane Kailey notified Imperial Oil of this issue in its March 9, 2010 letter.

While MDT's Bridge Bureau does not have the 14 configurations referenced in this question, any load that does not conform with one of the 12 configurations analyzed or if any load exceeds axle weight requirements established by the MDT Bridge Bureau, MDT will withhold permits pursuant to A.R.M. 18.6.601 (1) & (2).

Question No. 2: Will MDT analyze every bridge on the route for every one of the 14 truck configurations prior to constructing turnouts?

Comments inserted within Question No. 2: Testimony provided by Ms. Murgoitio during the IDT contested case hearing held in Boise in April state explicitly that she had analyzed every bridge in on the KMTP route in ID for every one of 14 truck configurations, using software provided by the American Association of State Transportation and Highway Officials (AASHTO). Will MDT also analyze every bridge on the route in MT for every one of the 14 truck configurations, prior to construction of turnouts?

MDT's Response to Question No. 2: MDT's only analyzes configurations submitted by the applicant. It does not analyze configurations submitted to the Idaho Department of Transportation. For the 12 configurations Imperial Oil submitted, MDT has analyzed potential impact to bridges along the route by identifying each bridge location and "design live load capacity"¹. Based upon in-service design, structure condition, bridge span and other load allowances for the structures, MDT determines those bridges with most limited capacity for the proposed configuration and identifies those structures as "controlling bridges". MDT then analyzes the proposed configuration for these controlling bridges, and applies appropriate load and travel restrictions. If the bridge live load capacity is less than the overload, the permit is not approved.

Question No. 3: Does MDT have every bridge on the route entered into their automated software database for analysis, or would the work of analyzing every bridge for 14 truck configurations have to be done by hand?

Comments inserted within Question No. 3: Attached "Exhibit 5_Murphy email" has Mr. Murphy stating that "*While we have started to enter all of our bridges into our load-rating software, that process is in its early stages so we do not as yet have the overweight bridge analysis procedures automated. To this point we need to do this by hand. To analyze every bridge on every route for every truck configuration we see in these requests, and to do it in the time required for permit issuance would be impossible.*" What this indicates is that MDT may well not have the resources to do a full analysis on all bridges the KMTP route, as IDT did with their automated software from AASHTO.

MDT's Response to Question No. 3: MDT uses a bridge management system as a screening tool to identify structures impacted by the route analysis such as span lengths, structure design, structure condition, inspection data, location, and load capacity. However, MDT does not use an automated system to process its bridge load analysis. The implication that MDT does its route analysis "by hand" is a misleading. MDT's bridge analysis method captures maximum load effects on structures based on axle spacing, configurations and loads and then compares these

¹ For this purpose, "design live load capacity" refers to the bridge capacity to support moving vehicle loads.

results to the known load capacity value of the individual bridge structure. While MDT utilizes Opis/Virtis² and other software tools, proper analysis requires engineering judgment.

Question No. 4. What will happen if a KMTP truck that has been permitted is weighed at the Port of Lewiston and it is discovered that the axle weights exceed either the limitations issued by Ms. Murgoitio of IDT in her memo of 14 July 2010 or the maximum axle weights referenced by the single-truck configuration approved by Mr. Murphy?

Comments inserted within Question No. 4: This question is critical. It is our understanding that when the Conoco-Phillips shipments were weighed at the Port of Lewiston, the axle weights were actually significantly heavier than what had originally been permitted, which resulted in some “scrambling” by IDT to re-evaluate the bridges along the route to determine what permit restrictions were needed in order to ensure that the bridges were not overloaded (per Laird Lucas, lead attorney for the plaintiffs in the IDT contested case hearing). Therefore, it is not unreasonable to anticipate that some of the 207 KMTP loads may not adhere to the original permit requirements – especially as the weight restrictions placed by Ms. Murgoitio were issued only a couple of months prior to the modules arriving in the U.S. from Korea.

In her testimony, Ms. Murgoitio discussed using IDT’s software to determine what permit restrictions would suffice to reduce the dynamic impact of a truck on a bridge down below that which a bridge is rated for. Examples of these restrictions include: slowing the truck down, adding helper dollies, and/or detaching the push truck. It is unclear why she discussed the need for these measures in her testimony, unless she anticipates that the trucks may not adhere to her weight restrictions and she may need to place some additional restrictions on the permits, as indicated by subsequent analysis of the bridges based on the actual weights of the axles, as evidenced by scales at the Port. This, it is our understanding, is exactly what happened with the CP loads.

- 1) MDT does not have all the bridge information entered into a software database AND has not performed a prior analysis of every bridge and every truck configuration, AND
- 2) KMTP trucks end up weighing more than originally indicated by the configuration reviewed by Mr. Murphy, THEN
- 3) The increased axle weights may exceed bridge ratings for one or more bridges on the route in MT, which MDT will not be in a position to quickly analyze.

² Opis/Virtis, the software referenced by the commenter, has had the capability to process non-standard gage loads, such as KMTP for approximately five years. While MDT uses this software for other purposes, MDT does not use Virtis as a permitting tool. MDT analyzed the KMTP using the above-described method, a method used by the agency since the late 1990’s. It is MDT’s determination that the process is accurate and effective. In addition, the Virtis software is a work in progress. MDT, as well as other users, has logged a number of errors with the Virtis contractor in its use of the software. Thus, it is MDT judgment that relying solely on Virtis for analyzing overweight permit applications does not ensure an adequate analysis.

MDT's Response to Question No. 4: This question indicates that MDT only analyzed one configuration. That statement is incorrect: MDT analyzed 12 configurations associated with the KMTP. While MDT does not have the memo to which the commenter refers, in the event that a module does not conform to the axle weight requirements established by the MDT Bridge Bureau, the applicant is in violation of the permit and the load will not move on the Montana system unless the transporter reconfigures the load to obtain allowable limits. See § 18.8.601(1) &(2), ARM. If the load cannot be reconfigured, the transporter will be required to submit a new permit application with a revised configuration, and the load would be permitted only if, after analysis, the revised configuration is approved.³

Question No. 5. Without analyzing every bridge for every truck – including actual weights obtained from scale readings if need be – how can MDT ascertain that “DW21” restrictions will suffice to reduce dynamic impact to within bridge readings?

Comments inserted within Question No. 5: Mr. Murphy references the issuance of what is known as “DW21” restrictions, which require that the trucks slow to 5 mph and proceed along the centerline of all bridges; this is apparently standard for all overweight permits. The CP permit also required that the trucks come to a complete stop 50 feet before each bridge. However, Ms. Murgotio suggested that it may be required to add help dollies and/or detach the push trucks in order to sufficiently reduce dynamic impact. Without doing a full software analysis of each bridge and each load, how can MDT assert with any certainty that speed restrictions alone will be sufficient in MT if they are not in ID?

MDT's Response to Question No. 5: MDT's normal analysis includes a dynamic load allowance. A DW21 restriction referred to by the commenter is set forth in § 18.8.602, ARM. This restriction placed on certain overweight loads, requires the transporter to come to a full stop 50 feet prior to the structure and cross over the centerline of the structure at a speed not to exceed 5 mph. This restriction eliminates the dynamic load impact to the structures. With regard to the commenter's concern regarding procedures described by Idaho officials requiring the transporter add helper dollies and attach and detach the push truck, these activities would change load configuration over the structure and does not impact the dynamic load allowance.⁴

³ The Commenter's statement that MDT is not in a position to “quickly analyze” revised configurations is in error. MDT analyzes revisions by identifying the controlling bridges and changing the axle weights within the software tools to determine the new load effects on the controlling bridges.

⁴ In general a pusher is required by the hauler not the permitting agency. A pusher adds power so the load can be moved over a steep grade, for example. If a pusher is required, it is included as part of the overall configuration for bridge analysis. Helper dollies are added to further distribute the load to the bridge deck and girders below. When a bridge analysis indicates that a load cannot cross a particular bridge, a helper dolly may be added to help distribute the load. The new configuration is then re-analyzed. In general the original configuration (without the helper dolly) must be denied before helper dollies are added. It should be noted that the helper dollies referred to in the testimony were for the Conoco Phillips loads not the KMTP loads. Idaho determined helper dollies were needed, Montana determined that they were not. Those loads have been delivered safely, and as expected caused no ill effects to Montana's bridges.

Question No. 6. Above concerns about potential for bridge overloading notwithstanding – how does the requirement that all trucks stop 50 feet ahead of every single bridge and slow to 5 mph across each bridge figure (sic) requirement that the trucks do not delay traffic for more than 15 minutes? Does MDT have numbers demonstrating that the KMTP trucks can both slow down enough to adequately protect bridges, without increasing length of associated traffic delays beyond the maximum stipulated by the permit?

Comments inserted within Question No. 6: I think this question is self-explanatory, and if only one question gets asked, make it this one. The other questions MDT may be able to stonewall as being based on speculation, but this one is appropriate regardless of the final weight of the truck axles.

MDT's Response to Question No. 6: MDT's administrative rules require that Imperial Oil limit traffic delay to ten minutes. § 18.8.1101, ARM. The KMTP Transportation Plan provides that:

For the transportation plan, experienced drivers have estimated loaded hydraulic trailer travel speeds of 30 mph on straight stretches and 6 mph, 8, mph, 10 mph, 20 mph or 25 mph depending on the grade and other road conditions. Based on these stated speeds and taking into account the transport's acceleration and deceleration, turnout locations, and slowing down for bridge crossings at 5 mph and center of bridge as per permit requirements have been identified to adhere to Montana's 10 minute maximum delay rule. KMTP Transportation Plan (Rev K).

The data provided by Imperial Oil's contractor, Mammoet in Appendix 2, of the KMTP Transportation Plan, (Rev K) demonstrates compliance with the ten minute rule. In the event the carrier cannot comply with the ten minute maximum traffic delay rule set forth in § 18.8.1101, ARM, MDT will withhold permits until a revised plan is presented.

Question No. 7. Given all of the above uncertainty, how does MDT justify construction turnouts if the agency has not performed a full engineering analysis of every bridge and every truck configuration, and if they have not calculated how speed restrictions can fit within the time-delay window allowed by their permitting regulations?

Comments inserted within Question No. 7: To put it another way – if MDT has not done all of their homework to ascertain without question that a viable solution exists to all of these concerns, is it reasonable to proceed with permanently altering the landscape to accommodate this project?

MDT's Response to Question No. 7: MDT disagrees with the premise. MDT has performed a full engineering analysis of the route for the trailer configurations submitted for the KMTP. MDT reviewed the KMTP Transportation Plan for module speed, turnout placement, speed restrictions, and maximum time delays. Based upon its analysis and review, MDT has determined that the KMTP will not adversely impact the structures or violate the ten minute rule.