



Interim Update on

# Improvements to Highway-Rail Grade Crossings and Rail Safety

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Preparedby

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# Legislative request

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This interim update is issued to comply with Laws of Minnesota 2014, Chapter 312, Article 10, Section 10.

## **IMPROVEMENTS STUDY ON GRADE CROSSINGS AND RAIL SAFETY FOR OIL AND OTHER HAZARDOUS MATERIALS TRANSPORTATION.**

(a) The commissioner of transportation shall conduct a study on highway-rail grade crossing improvement for oil and other hazardous materials transported by rail, and on rail safety. At a minimum, the study must:

- (1) provide information that assists in risk management associated with transportation of oil and other hazardous materials by rail;
- (2) develop criteria to prioritize needs and improvements at highway-rail grade crossings;
- (3) consider alternatives for safety improvements, including but not limited to active warning devices such as gates and signals, closings, and grade separation;
- (4) provide findings and recommendations that serve to direct accelerated investments in highway-rail grade crossing safety improvements; and
- (5) analyze state inspection activities and staffing for track and hazardous materials under Minnesota Statutes, section 219.015.underline end

(b) The commissioner shall submit an interim update on the study by August 31, 2014, and a final report by October 31, 2014, to the chairs and ranking minority members of the legislative committees with jurisdiction over transportation policy and finance.

The cost of preparing this report is under \$5,000.

## Summary

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In 2014, the legislature directed the Minnesota Department of Transportation to conduct a study of highway-rail grade crossings improvements for rail corridors carrying unit trains of crude oil and other hazardous materials. In addition, the legislature appropriated \$2 million for implementation of safety improvements at highway-rail grade crossings, specifically along crude-by-rail corridors (*see* Laws of Minnesota 2014, Chapter 312, Article 9, Section 6, Subdivision 2d). This appropriation will fund the installation of approximately eight grade crossing signal systems or alternative railroad grade crossing improvements related to site needs identified in the study.

# Background

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Bakken shale oil was identified by the federal government as a highly volatile flammable material, and accounts for a significant new rail commodity that increased from almost no rail transport in 2005 to nine fully loaded crude oil trains originating from North Dakota every day in 2014. This oil was involved in several recent catastrophic incidents, including the Lac Megantic, Quebec, derailment and fire that killed 47 persons in July 2013, as well as the Casselton, N.D., fire in January 2014. These and other incidents demonstrated the potential safety risks involved transporting large volumes of hazardous material by rail. The study will focus on the three rail corridors currently carrying unit trains of Bakken crude oil from North Dakota through Minnesota: (1) the BNSF mainline from the Twin Cities to Fargo/Moorhead via St. Cloud, Staples and Detroit Lakes, (2) the Canadian Pacific's mainline from LaCrescent to the Twin Cities and then to North Dakota via Glenwood and (3) the BNSF corridor from Fargo/Moorhead to Willmar to the South Dakota border via Marshall and Pipestone. These corridors represent about 830 miles of the 4,400 miles of railroad track in Minnesota, and are protected by approximately 500 separate grade crossing signal installations. The legislative charge included identifying sites where safety can be improved to reduce public exposure to derailments, spills and fires in areas that exhibit the highest risks for personal injury and property damage. Strategies include crossing closures, grade separations, upgrading passive warnings to active signals and improving active protection with more effective treatments. This interim report will be followed by a final report on Oct. 31, 2014.

# Methodology

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MnDOT is employing internal expertise in rail and grade crossing safety as well as mapping, traffic measurement and risk analysis to accomplish a comprehensive evaluation of grade crossings in targeted crude oil corridors. MnDOT, in coordination with the Department of Public Safety, surveyed counties and cities to isolate special conditions and concerns. The input provided through the Governor's Rail Safety Roundtables that began on Aug. 11, 2014, is also being incorporated as are results of site visits and face-to-

face communications with local officials, emergency responders and citizens along the corridors.

All crude-by-rail corridor grade crossings are receiving a multi-part comparative score involving three index numbers. The first and most important score is the public risk assessment based on population density within one half mile of each crossing, which is the federal hazmat response guidance for potential risk and recommended evacuation for this particular commodity. GIS mapping and satellite imagery were employed to delineate the buffer zones and the number of households, businesses and other facilities within the threat area. Comparative scores are given for residential population levels; fixed vulnerable populations such as hospitals, nursing homes, and prisons; and transient vulnerable populations such as schools. The presence of public service facilities including fire and police stations are also located and counted.

The second score involves the combination of a Federal Railroad Administration safety index. This index includes a predictive catalog of possible grade crossing accidents, with recorded accidents, general vehicle counts, heavy commercial vehicle counts, special road uses such as emergency access, evacuation routes, school bus routes, and presence of other nearby traffic generators. The safety index includes consideration of train counts, highway vehicle counts, speeds and existing safety equipment. It also allows for evaluation of variances in levels of traffic and levels of protection.

The third score involves existing conditions not specific to the first two indexes. It ranks the general crossing conditions on a sliding scale, including sight lines, grades and approaches to the crossing, crossing and road surfaces and condition, and other variations from ideal specifications that may influence accident risks and operations over the crossing.

## Current Status

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An initial survey of counties and cities was circulated on May 30, 2014. The results of this survey highlighted local concerns. GIS and traffic specialists were brought on board to map facilities and buffer zones, and confirm traffic counts, particularly heavy commercial vehicle traffic that poses a special risk of derailment in grade crossing accidents.

MnDOT's rail project managers were employed in engineering and safety evaluations, as

well as outreach to the railroads. Railroads voluntarily provided their own crossing evaluations, including accident and near-miss reports.

The score sheet was developed with cooperation from all involved parties. It was further refined by application to a variety of random crossing sites with known ranges of conditions. The MnDOT grade crossing database—updated annually by road authorities and railroads per federal rules—was used to populate a spreadsheet of all targeted crossings. The final spreadsheet will include the basic data as well as the scorings, while a file of individual scoring sheets will be maintained for reference. Analysts dedicated to the evaluation process are currently scoring all mainline crossings while deleting non-involved local crossings and correcting other data inconsistencies.

The actual scoring is approximately 25 percent completed. Results should be available for advanced site evaluations by late September. Each crossing will receive an action recommendation. The highest-risk crossings will receive a detailed recommendation, with commentary on the relevant situation and existing conditions. Given the limited funds available for the first round of improvements, the cost-benefit of the initial projects will be of primary importance. This will most likely involve closures and active signal enhancements, while a more comprehensive strategy that includes grade separations at key crossings will be discussed in the study conclusions for possible future action.



# Appendix: Crude Oil Rail Routes Map

