National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: March 2, 2012

In reply refer to: R-12-11

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The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge you to take action on the safety recommendation in this letter. The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the inspection and maintenance of storm water detention ponds. The recommendation is derived from the NTSB's investigation of the June 19, 2009, derailment of a Canadian National Railroad Company (CN) freight train in Cherry Valley, Illinois, and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the NTSB has issued 15 safety recommendations, 1 of which is addressed to your organization. Information supporting this recommendation is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

About 8:36 p.m., central daylight time, on Friday, June 19, 2009, eastbound CN freight train U70691-18, traveling at 36 mph, derailed at a highway/rail grade crossing in Cherry Valley, Illinois. The train consisted of 2 locomotives and 114 cars, 19 of which derailed. All of the derailed cars were tank cars carrying denatured fuel ethanol, a flammable liquid. Thirteen of the derailed tank cars were breached or lost product and caught fire. At the time of the derailment, several motor vehicles were stopped on either side of the grade crossing waiting for the train to pass. As a result of the fire that erupted after the derailment, a passenger in one of the stopped cars was fatally injured, two passengers in the same car received serious injuries, and five occupants of other cars waiting at the highway-rail crossing were injured. Two responding firefighters also sustained minor injuries. The release of ethanol and the resulting fire prompted a mandatory evacuation of about 600 residences within a 1/2-mile radius of the accident site. Monetary damages were estimated to total $7.9 million.[1]

The NTSB determined that the probable cause of the accident was the washout of the track structure that was discovered about 1 hour before the train's arrival, and the CN's failure to notify the train crew of the known washout in time to stop the train because of the inadequacy of the CN's emergency communication procedures. Contributing to the accident was the CN's failure to work with Winnebago County to develop a comprehensive storm water management design to address the previous washouts in 2006 and 2007. Contributing to the severity of the accident was the CN's failure to issue the flash flood warning to the train crew and the inadequate design of the DOT-111 tank cars, which made the cars subject to damage and catastrophic loss of hazardous materials during the derailment.

The rain storm on the day of the accident caused flooding in many areas of Winnebago County, in particular, the city of Rockford and the village of Cherry Valley. The city of Rockford's storm water drainage system surrounding the residential neighborhoods north of the CN and UP tracks and west of Mulford Road captured the runoff created by the storm and directed water into the two storm water management (SWM) detention ponds constructed for the Harrison Park subdivision.

The investigation revealed that the larger of the two detention ponds, SWM pond 1, had sustained significant deterioration before the storm of June 2009. Local homeowners provided documentation showing severe erosion of the upper portion of the berm over the outlet pipe more than 2 years before the accident. The erosion rendered the portion of the pond berm above the outlet significantly lower than when the pond was originally constructed. When the unusually high water level in the pond on June 19 rose to the bottom of the deteriorated berm section, the water began to escape through the opening. Once the water was able to overflow, it quickly began to further erode the berm, thus allowing more water to outflow and accelerating the deterioration. Although the water pouring out of this breach added to the water from the heavy rains, the investigation was unable to determine the amount of water from the detention pond release that may have reached the intersection of the CN tracks and Mulford Road.

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[1] See *Derailment of Canadian National Railway Company Freight Train U70691-18 With Subsequent Hazardous Materials Release and Fire, Cherry Valley, Illinois, June 19, 2009*, Railroad Accident Report NTSB/RAR-12/01 (Washington, DC: National Transportation Safety Board, 2012) on the NTSB website at <http://www.ntsb.gov>.

The presence of debris on the top of tracks to the west of the open deck bridge about 0.1 mile west of the crossing indicated that at some point, the water that had collected in the area between the UP and CN tracks attempted to follow the natural water drainage route. Normally, the runoff would have flowed under the tracks at the open deck bridge. From there, it would have gone into the creek running along the south side of the tracks and would have continued south as part of this creek, passing through the concrete box culvert under Mulford Road. On the day of the accident, however, the opening at the open deck bridge was not large enough to accommodate the volume and flow rate of the storm water. The damage to the retention wall on the east side of the bridge was evidence that the water level was high enough to cover the bridge retaining wall and wash away the soil from behind it. As with other physical evidence, this indicates that the amount of water present before the derailment overwhelmed the existing water management system.

Maintenance of detention ponds is typically the sole responsibility of property owners. In the case of Harrison Park SWM pond 1, the party responsible for maintaining the pond was the Harrison Park Landowners Association as represented by a local real estate firm. In April 2008, the association was aware that erosion over the outlet pipe was affecting the integrity of the pond, and in the same month the landowners' agent received a proposal to repair the pond. However, the landowners' agent did not begin assessing homeowners to pay for the work until the beginning of 2009, ensuring that the damage to the pond would not be corrected until more than a year after the deterioration had first been documented. At any point during that time, a heavy flood storm could have occurred that would have enlarged the initial breach and created a safety hazard for those downstream, as occurred on the day of the accident. The NTSB therefore concluded that the breach in Harrison Park SWM pond 1 that was documented in 2008 posed a downstream risk in the event of a heavy storm, and more timely measures should have been taken to repair the defect and restore the integrity of the pond.

When a storm water management detention pond is breached or otherwise loses its structural integrity, damage can occur downstream with regional consequences. For that reason, although maintenance of a detention pond is usually the responsibility of the property owner, local storm water management authorities have a vital interest in ensuring that the ponds are functional.

The city of Rockford was required by the state of Illinois to inspect detention ponds, but only from the perspective of water pollution. The ponds were not inspected for function. Even for water pollution, inspections by the city were infrequent, with only three citywide inspections having been performed in the 5 years before the accident.

After the accident, the city of Rockford developed a storm water inspection program for large detention ponds, both public and private, after a major rain storm. In addition to detention ponds, the city's major storm monitoring program now includes inspections of bridges, culverts, major creeks, and drainage ways. The city also evaluates the physical condition of storm water detention ponds and requires inspections by storm water authorities if any physical aspect of a pond is rated less than "good." Finally, the city has contacted local homeowners associations and required that they immediately notify the city of any physical damage to a storm water management detention pond, drainage way, or culvert after a major storm event or whenever such damage is discovered. Had these provisions been in force and followed before the accident,

city inspectors would likely have discovered the deterioration in Harrison Park SWM pond 1 and may have been able to work with the property owners to effect a more timely repair. The NTSB concluded that regular inspections by municipalities or other government authorities of storm water detention ponds, both public and private, would help ensure that the ponds function as designed to reduce the likelihood of damage to property or injuries to people.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the National League of Cities, to the National Association of Counties, to the Association of State Dam Safety Officials, to the National Association of Towns and Townships, and to the U.S. Conference of Mayors:

> Inform your members of the circumstances of this accident and emphasize the importance of periodically inspecting storm water management detention ponds (both private and public) to ensure that no deterioration has occurred that would result in the failure of a pond to function as designed. (R-12-11)

The NTSB also issued safety recommendations to the U.S. Department of Transportation, to the Federal Railroad Administration, to the Pipeline and Hazardous Materials Safety Administration, to the Association of American Railroads, to the American Association of State Highway and Transportation Officials, to the National Association of County Engineers, to the American Public Works Association, to the Institute of Transportation Engineers, and to the Canadian National Railway Company. The NTSB also reiterated previously issued safety recommendations to the Federal Railroad Administration and the Pipeline and Hazardous Materials Safety Administration.

In response to the recommendation in this letter, please refer to Safety Recommendation R-12-11. We encourage you to submit updates electronically at the following e-mail address: correspondence@ntsb.gov. If a response includes attachments that exceed 5 megabytes, please e-mail us at the same address for instructions. To avoid confusion, please do not submit both an electronic copy and a hard copy of the same response.

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in this recommendation.

[Original Signed]

By: Deborah A.P. Hersman
Chairman