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Metro Scare Under Potomac

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Note: Information developed and distributed by others about the Washington Metropolitan Area Transit Authority and our work often requires amplification, correction, clarification, and sometimes commentary. Analyses like these ensure that an accurate, complete, and balanced perspective is available to those who are interested in, engaged in, and care about our work and purpose.

Text in bold in the left column is the subject of clarification, correction, or commentary in the right hand column.

	Article	Corrections, Clarifications, or Commentary
1	In a tunnel below the Potomac River four years ago, Larry Mitchell was at the controls of a crowded rush-hour Metro train headed to Rosslyn when he saw a glimmer of red reflecting off the walls. The train's crash avoidance system indicated that the track ahead was clear, but Mitchell sensed danger in the distance. He decided to override the system and brake manually -- then watched helplessly as his train rolled to a stop just 35 feet short of a train ahead. As a shaken Mitchell radioed Metro supervisors, he was interrupted by the operator of the train behind him, who announced that he had just caught sight of Mitchell's train and hit his emergency brake. "You could hear the panic in his voice," Mitchell said. That train ground to a halt 20 feet short of Mitchell's. The outlines of the 2005 near-miss -- the first of three known breakdowns of a crash avoidance system designed to be fail-safe -- were made public shortly after it occurred. But newly obtained records and interviews detail just how close the trains came to what documents said would have been "disastrous collisions."	

2	They also illuminate similarities to the June 22 Red Line crash that killed nine people near Fort Totten as well as to **a March 2 incident in which two trains came "dangerously close"** on Capitol Hill. The Washington Post first reported the March incident last month.	In the incident on March 2, the trains were about 500 feet apart. A city block is 440 feet. This is a safe distance. Metro posted a correction/clarification to the article cited in this paragraph.
3	The National Transportation Safety Board, which is investigating this summer's deadly crash, confirmed that the 2005 incident has become a focus of its probe and that its investigators recently examined records from both near-collisions. **They also tested hardware taken from the 2005 incident site to compare with similar equipment recovered from the crash.**	In the August/September of 2005, a Metro engineer examined the modules in the track circuit with a Spectrum Analyzer to check all module signals for electronic noise or unwanted harmonics. None were found. Then the engineer removed power and opened the modules. The engineer inspected all electrical connections inside the module using a 20X microscope for any possible shorts caused by foreign matter or bent connections. No problems were found.
4	**Records and interviews indicate that Metro engineers did not perform exhaustive on-site tests of all components related to the incident in 2005 because they thought they had found the problem and did not want to further inconvenience passengers.** Records also show regional safety officials were not formally notified that Metro had put into effect its own recommendations on how to make the subway safer.	In the August/September of 2005, a Metro engineer examined the modules in the track circuit with a Spectrum Analyzer to check all module signals for electronic noise or unwanted harmonics. None were found. Then the engineer removed power and opened the modules. The engineer inspected all electrical connections inside the module using a 20X microscope for any possible shorts caused by foreign matter or bent connections. No problems were found.
5	Metro officials said they responded appropriately to the 2005 incident, identified the problem with the crash avoidance system and fixed it. A Metro spokeswoman said the cause was an electrical short circuit in cables under the tracks. She described it as "very different" from the fluctuating track circuit suspected of causing the recent accident. Cables are one component of a track circuit, which is a key part of the safety system.	

6	Metro officials say the system is safe. Until June, no passengers had died in a crash since 1982.	
7	After the 2005 incident, **Metro's safety office made six recommendations** aimed at avoiding a recurrence. By the time of this summer's crash, records show, none had been formally implemented and approved by the Tri-State Oversight Committee, which monitors Metro safety.	✓ The first recommendation was that Metro should evaluate the track circuit design to determine the extent to which current and future designs can be modified to prevent a recurrence of that type of failure. This was done. Changes were made to our standard specification to improve the physical separation between cables of audio frequency track circuits. ✓ The second and third recommendations were that Metro should continue to monitor track circuit behavior and formalize the process. To implement these recommendations, Metro created the computerized tool for detecting loss of shunt incidents, or incidents in which a train is not detected. Metro also created the computerized tool for detecting loss of shunt incidents, or incidents in which a train is not detected. The tool was used weekly to monitor track circuit performance for one year. As the tool had not identified any serious problems in that time, it seemed reasonable to use the tool monthly after July 2006. Since the June 22, 2009 accident, the tool has been

		used twice a day to monitor track circuits. ✓ The fourth recommendation was that a rule should be created that requires train operators to immediately report to the Operations Control Center the use of emergency brakes, like those that were used during the 2005 incident. This rule was already in place in the 2004 rule book. ✓ The fifth recommendation was that when an emergency brake is used to prevent a collision between trains, Metro should require all trains moving through the area of the incident to proceed only with the permission of a controller; take the incident train out-of-service at the next available station and ultimately take it off the rail line; take the Train Operator out-of-service; Report the incident to appropriate maintenance and engineering groups; document the event and conduct an investigation of the train and the ATC system. These policies were already in place, and were reviewed as a result of the incident. ✓ The sixth recommendation was that Metro should create a special reporting code for the use of brakes to prevent a collision between trains. A routine part of train or signal control incident investigations includes analysis of how brakes were applied during

		any given incident. That information is then entered into a computer system for tracking purposes.
8	"We asked Metro for information on how those six recommendations would be implemented," the committee said in a statement to The Post. "We have not received any evidence that Metro has yet put them into practice." Metro officials initially told The Post that they had put the recommendations into effect and notified the committee of the corrections years ago. In response to additional questions, a spokeswoman issued a second statement saying "we were mistaken" in asserting that the committee had closed out the issue. Nonetheless, she stressed, the corrections had been made. The Post obtained documents related to the incidents through open-records requests to the Tri-State Oversight Committee. Metro officials did not respond to similar requests.	
9	"I was assured that it would be looked into and taken care of," said Mitchell, who can recall coming so close to the train's red taillights that he could see the expressions of a man and a young girl in the last car. "Four years later, I've never received any information. I have no idea to this very day what happened."	
10	**'They Didn't Do It Thoroughly'** Rail safety specialists who reviewed documents obtained by The Post said there are striking similarities between the 2005 incident and this summer's crash, and they questioned whether Metro had done enough to determine all possible causes of the earlier near-collision.	All of the facts about this incident have been provided to the NTSB, as have the circuit modules. Any conclusions or inferences drawn from this data should come from the NTSB officials involved in the investigation. As the lead agency in the investigation, the NTSB is the single source for definitive

		commentary on the root cause of the accident. The NTSB commentary on the accident can be found at the following links: http://www.ntsb.gov/pressrel/2009/090625.html http://www.ntsb.gov/pressrel/2009/090701.html http://www.ntsb.gov/pressrel/2009/090713.html http://www.ntsb.gov/pressrel/2009/090723.html http://www.ntsb.gov/pressrel/2009/090729.html http://www.ntsb.gov/pressrel/2009/090731.html
11	After the 2005 incident, documents show, engineers concluded that a cable in a track circuit at the site failed, causing a train to "disappear when it occupied a certain position within the track." A malfunctioning track circuit is also suspected of being at the heart of this summer's crash, in which federal investigators say Metro's automated system failed to detect a stopped train and did not send a stop command to an approaching one.	
12	Investigators have not pinpointed the cause of the circuit failure at Fort Totten but are testing a type of equipment known as a module. For comparison, they also have decided to test the same type of equipment removed from the site of the 2005 incident, said Bob Chipkevich, head of the NTSB rail investigation office.	
13	After the 2005 incident, Metro engineers spent days looking for a cause before concluding that the problem was a short in a cable. To eliminate train delays during the investigation, they replaced the cables and other components that make up the track circuit. A Metro engineer noted in a report at the time that the investigation had been "inconveniencing patrons for a week already." He added: "The commitment to return the track circuit to normal as soon as possible precluded additional testing."	

	Engineers from the company that made the equipment agreed with Metro in a letter that the failure probably resulted from a short circuit in the cables. But they wrote that they "could not confirm that this was the actual root cause" because Metro separated the cables "before testing could take place."	
14	Metro engineers did not examine the modules more extensively at the time because they were determined not to be the cause, said Metro spokeswoman Lisa Farbstein. They planned to inspect them later in a laboratory, the report said. **A couple of months later, engineers examined the modules for anything that could cause an electrical short and found no problems,** Farbstein said. She said Metro has no record of that inspection, but an engineer told her that he did it.	In the August/September of 2005, a Metro engineer examined the modules in the track circuit with a Spectrum Analyzer to check all module signals for electronic noise or unwanted harmonics. None were found. Then the engineer removed power and opened the modules. The engineer inspected all electrical connections inside the module using a 20X microscope for any possible shorts caused by foreign matter or bent connections. No problems were found.
15	**Russell Quimby, who retired in 2007 after 22 years at the NTSB as a rail safety engineer, criticized Metro for not conducting more testing.** **"They didn't do it thoroughly," Quimby said. "Anything that could have caused that system to fail, they should have tested at the time. They said, 'This is it, shut your lunchboxes, let's go home.' "**	All of the facts about this incident have been provided to the NTSB, as have the circuit modules. Any conclusions or inferences drawn from this data should come from the NTSB officials involved in the investigation. As the lead agency in the investigation, the NTSB is the single source for definitive commentary on the root cause of the accident. The NTSB commentary on the accident can be found at the following links: http://www.ntsb.gov/pressrel/2009/090625.html http://www.ntsb.gov/pressrel/2009/090701.html http://www.ntsb.gov/pressrel/2009/090713.html http://www.ntsb.gov/pressrel/2009/090723.html http://www.ntsb.gov/pressrel/2009/090729.html http://www.ntsb.gov/pressrel/2009/090731.html

16	Metro's safety office developed six recommendations for changes after the incident. One was that engineers should improve track circuit design, records show. Other recommendations said engineers should upgrade software used to monitor the circuits and formalize the monitoring process.	
17	On the day of this summer's crash, documents show that the Tri-State Oversight Committee's database continued to list all six of the recommendations as "open." For each recommendation, the database shows that a corrective action plan was listed as still "to be developed." Metro said that although it never told the oversight group about its actions, it had made the needed fixes and developed a software program to check for problems with the system. Officials said they used the software to look for circuit malfunctions once a week in the days after the 2005 incident. A year later, they dropped the frequency to once a month because they said they found no problems. Since the crash this summer, they have increased software checks to twice a day.	
18	The NTSB concluded that Metro's crash avoidance system is inadequate and urged the addition of a real-time backup technology.	The NTSB also made an urgent recommendation to the Federal Transit Administration (FTA) urging the agency to advise all rail transit operators with train control systems capable of monitoring train movements to evaluate their systems for adequate safety redundancy.
19	It is impossible to determine whether a more aggressive response to the 2005 incident could have averted this summer's crash. But federal officials have long considered Metro's slowness in closing out safety investigations to be a critical concern.	

20	Records show the Tri-State Oversight Committee was concerned by Metro's lack of response to the 2005 incident even before the Fort Totten crash. **In April of this year, after the near-collision on Capitol Hill, the committee drafted a letter to Metro's chief safety officer, asking her for the status of the six recommendations and noting that the committee had been "unable to verify the progress and implementation."**	Metro's Safety Office meets with the Tri-State Oversight Committee (TOC) face-to-face on a monthly basis. In addition, since July 2008, Metro developed a series of additional work sessions with the TOC to discuss and review specific subjects such as accident reports and action plans. Since this effort began, Metro has closed out three-quarters of the outstanding issues, 144 of 192, with the TOC. Office space was also made available for a member of the TOC to work in Metro's Safety Office in an effort to improve progress in closing out various reports.
21	But the committee, **which has no direct authority over the subway system and relies on Metro's willingness to share information**, deleted any mention of the 2005 event from the final version of the letter. The change was made in the hope of expediting Metro's release of details about the March 2 incident, internal e-mail shows.	Metro's General Manager joined with the senior transportation officials of the District of Columbia, the State of Maryland and the Commonwealth of Virginia in recommending improved regional transportation oversight to the U.S. Secretary of Transportation.
22	**'The Adrenaline Was Pumping'** Mitchell, 58, remembers the June 7, 2005, near-collision in granular detail. During the evening rush, he said, he was pulling away from Foggy Bottom at up to 59 mph, carrying about 800 passengers in what operators call a "crush load." Unknown to Mitchell, just ahead in the tunnel below the Potomac, a train had stopped mid-river, waiting for the Rosslyn platform to clear. Mitchell saw the train ahead and hit his brake at 5:55 p.m., records show. He could do little more than come to his feet, brace himself against the	

	control panel and watch as his train stopped less than half a car length from the train ahead. "The adrenaline was pumping, I'll tell you that," Mitchell said. "That is too damn close." Moments later, he said, he heard the train operator behind him warn of an impending collision. "That's when I became afraid," Mitchell said. "That's when I knew something was very wrong." The entire incident lasted seven minutes, records show, and played out far from any exit or access point for rescue teams. No one was injured, and Metro gave Mitchell an award and a $1,000 bonus for his quick reaction. When news broke about the crash this summer, he said, "It put me right back in that same place." Mitchell attended the funeral of Jeanice McMillan, the train operator killed in this summer's crash. There, for the first time since his retirement this year, he saw the operator of the train that had come to a halt 20 feet behind him. They made small talk, Mitchell said, but made no mention of the four-year-old event that brought them both to pay their respects.	