September 30, 2019

Mr. Troy A. Lloyd, *Investigator in Charge*
National Transportation Safety Board
[redacted]

RE: Proposed Findings, Proposed Probable Cause, and Proposed Safety Recommendations in the matter of Amtrak Train #86 Striking an Engineering Employee near Bowie, Maryland on April 24, 2018; NTSB Docket No. RRD18FR006.

Dear Mr. Lloyd,

The Brotherhood of Maintenance of Way Employes Division (BMWED) of the International Brotherhood of Teamsters has been granted party status by the Board in the above-referenced investigation. BMWED respectfully submits these Proposed Findings, Proposed Probable Cause, and Proposed Safety Recommendations to the Board for consideration.

Accident Synopsis

On Tuesday, April 24, 2018, at approximately 9:01 a.m. Eastern Daylight Saving Time (EDST), National Railroad Passenger Corporation (Amtrak) passenger Train #86 struck and fatally injured a Maintenance of Way employee at PW MP 119.2 on the Amtrak Northeast Corridor near Bowie, Maryland in Prince George's County.

The train consisted of one (1) locomotive and eight (8) passenger cars. Amtrak Train #86 was operating north on main track No.1 at 98 mph within the maximum authorized speed of 110 mph. Train #86 consisted of lead Locomotive No. 625, and eight (8) cars hauling 251 passengers. There were no injuries

reported to passengers or crew. Local authorities, Amtrak police, transportation and Engineering supervisors, and emergency management personnel responded. Damages were estimated[1] at $700.00.

The weather at the time of the accident was light scattered clouds, winds from the east at 12 mph with no recordable gusting, and a temperature of 55°F. The Foreman/EIC (Employee In Charge) commented that "*It was a normal day. It was turning out to be a decent day, if the weather… warmed up for us*." (April 25, 2018 NTSB Interview with Foreman/EIC, page 38). Periodic weather readings recorded at the Baltimore/Washington International Thurgood Marshall Airport and published/archived by the Weather Underground (full archived weather reports for April 24, 2018 enclosed) show no unusual or non-typical weather conditions. Timestamped excerpts from the Weather Underground's records are captured below.

Time	Temperature	Wind	Wind Gusts	Atmosphere
6:54am	53°F	E at 8mph	0mph	Cloudy
7:54am	53°F	E at 9mph	0mph	Fair
8:54am	55°F	E at 12mph	0mph	Cloudy
9:54am	57°F	E at 13mph	0mph	Cloudy

See enclosed Weather Underground reports for more detailed information.

Track Description

Amtrak's Philadelphia to Washington (PW) Line lies in a southerly direction from Amtrak's 30th Street Station in Philadelphia, PA, to Washington, DC. The mile post (MP) numbering increases in the southward direction with MP 0.0 at 30th Street Station in Philadelphia and MP 134.6 at CP "AVENUE" in Washington, DC. Traveling northbound the mile post numbering decreases.

At the Point of Impact (POI), the PW Line consists of three (3) main tracks. The tracks are numbered from east to west No. 1, No. 2, and No. 3., and the current of traffic for all three (3) tracks is governed by NORAC Rule 261, which means trains can operate in either direction under signal indication. The track centers in the area of the accident are between 13 and 14 feet.

[1] Amtrak Incident Report for incident of April 24, 2018, Incident # 1176121.

Amtrak operates the main tracks in the vicinity of the accident as FRA Class 6 with a maximum authorized timetable operating speed of 105 mph for passenger trains. There is limited freight traffic on this section of the corridor. The tracks run roughly north and south, and Amtrak designates this territory in the timetable as north - south. The train dispatcher controls traffic at control points, and automatic block signals are located between control points which provide block condition information to Engineers. Signal indications are also displayed in the locomotive cab. The signal system is equipped with automated train control to enforce compliance with signal indications.

Looking North towards Curve 403 from the southbound platform at Bowie State Station. Train #86 is stopped in the distance.

Approaching the POI from the south, trains will traverse track with a descending grade from MP 120 to MP 118. The alignment of the track is curved, and there are two (2) Hot Spots[2] identified due to those curves. Those Hot Spots are at MP 119.7 for Curve 404, and at MP 118.4 for Curve 403. These Hot Spots are not identified with placards or decal stickers. The accident occurred at MP 119.2

Northbound train traffic was routed to No. 1 track due to the track outage on No. 2 track. The maximum authorized speed (MAS) for No. 1 track is 110 mph for designated Amtrak train sets, with a restricted MAS of 105 mph in the immediate area of the accident (MP 119 to MP 120.3).

. Northbound Maryland Area Regional Commuter (MARC) trains that operate on No. 1 track have a MAS of 95 mph due to scheduled station stops at Bowie State Station. Amtrak trains are not scheduled to make station stops at Bowie State Station.

All three (3) main tracks are constructed with continuous welded rail (CWR) fastened to concrete crossties on 24-inch centers with Pandrol elastic fasteners. The track centers measured between 13’ to 14’. The east or field side of No. 1 track at the POI had a typical ballast shoulder configuration. The ballast was flat and even with the tops of the crossties then, beginning 2’ off the field-side edge of the ties,

[2] Amtrak Engineering in conjunction with union participation developed a “Hot Spots” manual that identified areas where additional Watchmen/Lookouts are recommended due to environmental concerns like curvature, sight limitations and noise.

the ballast sloped down about 9' or 10' on about a 45° slope, ending at a one (1) lane dirt access road. There are brushy woods immediately adjacent to the east side of the access road.

Track Maintenance Work

Amtrak was engaged in a ballast Undercutting, Rail Destressing and Maintenance Program on Amtrak's Mid-Atlantic Division. This operation was staffed with work groups commonly referred to as "gangs" of about 30 workers each. Work responsibilities are broken into the following four (4) gangs. The Undercutter Machine and the work gang that supports it, the Rail Destressing and Welding Gang, the Track Surfacing Gang, and the Spoil Removal Gang,

Rail Destressing and Welding Operations were progressing on the out-of-service No. 2 track between PW MP 120.5 and PW MP 112.4, which was the working limits for this continuous outage. No. 1 track was adjacent and to the east, No. 3 track was adjacent and to the west of the out-of-service No. 2 track, and both No. 1 and No. 3 tracks were left in service or "hot", and no Slow By[3] speed restriction was put into place.

There was an expectation of 2,000 linear feet of production per day of the Rail Destressing/Welding portion of the operation. These welding maintenance functions were designated to be performed by Amtrak Boutét Gang Y-242, and was staffed by a Foreman/EIC, a Welding Foreman and Welders, Equipment Operators, Drivers and Trackmen. Gang Y-242 had been working inside the same out-of-service limits for 46 days prior to the accident and had been cutting rail with abrasive saws and welding rail using a Boutét aluminothermic procedure.[4] Rail sawing and rail welding are noisy processes and the equipment used in this process is equally noisy, all requiring the use of hearing protection. The fatally injured Employee was on this day assigned to provide Train Approach Warning[5] for the destressing operations. This position is commonly referred to as a Gang.

[3] A Slow By is a localized speed restriction on a rail line which is set below the track's normal speed limit. Slow By's are usually imposed by railway dispatchers for sections of track that are in some way deficient, or when there is a requirement to perform maintenance on a section of railway.
[4] Boutét aluminothermic procedure is a Thermite welding process of igniting a mix of high energy materials (also called thermite) that produce a molten metal that is poured between the working pieces of rail to form a welded joint.
[5] Train approach warning is a method of establishing on-track safety to warn roadway workers of the approach of trains in ample time for them to move to or to remain in a place of safety in accordance with the requirements of Title 49 Code of Federal Regulations (CFR) 214. SAFETY.

Prior to the Accident

Amtrak Gang Y-242 was headquartered at the Holiday Inn in Jessup, Maryland, which is located near the Bowie, Maryland work location. On April 24, 2018, at 6:00 a.m., Gangs Y-242 and Y-222 met in the lobby of the hotel, marked-up and reported ready for work. The gangs then promptly boarded the work bus and departed for the work location. The workers arrived at the east parking lot at Bowie State Station at approximately 7:00 a.m. and the Foreman/EIC conducted a job safety briefing with the gangs.

The Weekly Safety Focus of the job safety briefing was documented as being in connection with overhead storage, and the Security Focus discussed during the briefing meeting was regarding evacuation during a chemical attack, neither of which were germane to the work at hand. Unusual hazards associated with the work area were denoted on the briefing sheet. Tripping hazards, loose ballast, uneven surfaces and hearing protection were referenced and discussed, however the extent of discussion or participation is undetermined.

The safety rule reviewed at this job safety briefing was Amtrak's Safety Rule 4138, which generally provides that Watchmen, if practical, be stationed clear of all tracks at a point where they will have the best view of approaching trains in any direction. Over 30 workers signed the Job Briefing Documentation Sheet that morning and participated in the briefing.

The Roadway Worker In-Charge (RWIC) received out-of-service authority on No. 2 track by Amtrak Movement Permit Form D, No. 1102, made effective at 7:22 a.m. The out-of-service limits were BOWIE to a barricade erected just south of GROVE. Shortly thereafter, the RWIC notified the Foreman/EIC who then began an On-Track Safety Briefing.

The Foreman/EIC's On-Track Briefing discussed how No. 2 track was out-of-service and had been out since early March and the out-of-service limits were defined as from PW MP 120.5 BOWIE to PW MP 112.4 GROVE. The locations of barricades and portable whistle boards were also discussed. Section 5c of the On-Track Safety Briefing Sheet was checked indicating that the work location was considered a Hot Spot, noting curves/speeds/station as cause, also noting the normal direction of traffic as in accordance with NORAC Rule 261, meaning in this instance trains can travel in either direction on No. 1 track and No. 3 track. The same 30 plus workers signed the On-Track Safety Briefing Sheet that morning. The fatally injured employee signed Box 12 on both the Job Briefing Documentation Sheet as well as the On-Track Safety Briefing Sheet.

The Foreman/EIC said "*So at that time, we gave a job briefing. We gave an on-track. What was discussed was the watchman placement. There was going to be three plus the gentlemen who were here. Four. So four in total. The gentleman in question, Luke, he was the gang watchmen for the welding truck. That was his sole duty. He was going to move with them, clear up when they cleared. When they needed him, he was going to go back out there. There was three stationary."* (April 25, 2018 NTSB interview, page 6, lines 9-16).

The Foreman for the Rail Gang also stated that: "*The welders need their own watchman because they have tools like the grinder that makes a lot of noise. So we definitely want to put someone right across from them at all times"* (April 25, 2018 NTSB interview, page 11, lines 1-6).

Prior to the train strike, workers with the Rail Destressing and Welding Group were in the gauge[6] of No. 2 track saw cutting the east rail at PW MP 119.2. The Gang Watchman (the deceased) for the gang was posted almost directly across from the saw cutting, he was positioned on the field side on No. 1 track, standing up on the edge of the track and between the fifth and sixth catenary poles from the passenger platform at Bowie State Station. There was an approximate 8' to 9' drop or slope from the edge of the track to the access road below. This slope was composed of ballast, making standing and climbing up and down at this location difficult.

A Welder discussed the placement of the Gang Watchman, saying "*That's -- it's either you stand on basically the edge of the tie or the ballast. Right on the edge of the tie. In that scenario that's the only place there is to safely stand unless you stand on the hill that is, you know, it's got a serious grade. You can't stand on it."* He continued, "*So, yeah, I mean if I was watching that would probably be the same place I would be standing. It's not about me being able to see the banner or hear the horn at that point. It's about him being able to see the approaching train*." (April 25, 2018 NTSB interview, page 9, lines 2-15).

"*If he's down on that level access road or whatever it is -- he's going to have cat poles in his way. He's not going to be able to visibly see a train coming because he's the gang watchman. There's nobody north of him at all. It's his job to, you know, warn everybody, hey, there's a train coming from the north side*." (April 25, 2018 NTSB interview, page 9, lines 17-23).

[6] Gauge or track gage is the spacing of the rails on a railway track and is measured between the inner faces of the load-bearing rails.

Immediately prior to the train strike, the Gang Watchman, was providing Train Approach Warning for the northbound MARC train operating on No. 3 track.

Accident Timeline and Video Review

On May 31, 2018, at the NTSB headquarters at 490 L'Enfant Plaza, Washington, DC., the parties reviewed event recorder data from when Amtrak Train #86 struck an employee on April 24, 2018. This data included the Outward and Inward Facing Video starting at New Carrollton Station (MP 127), where Amtrak Train #86 had stopped on No. 2 track to discharge and pick up passengers. For purpose of the investigation, the videos ended several minutes after Train #86 came to an emergency stop. The visibility of the outward facing video was unobstructed by weather and image quality was satisfactory. These two (2) videos were captured at 30 frames per second. There was a 3.45 second difference between the forward facing and inward facing time stamps (synchronization issues), the inward facing being behind. Following is a copulation of information gathered by separately scrutinizing both videos.

- 8:55 a.m. Amtrak Train #86 was stopped at the northbound platform at New Carrollton station, the Engineer stepping out of the cab to check pantographs, then stepping back in, as is SOP.

- 8:55:45 a.m. Amtrak Train #86 began pulling away from New Carrollton Station on No. 2 track.

- 8:55:46 a.m. Amtrak Train #86 switched to No. 1 track at "Carroll" (MP 126.6) and had been operating northbound under limited clear (281c) signal indication. "*Proceed at Limited Speed until entire train clears all interlocking or spring switches, then proceed at Normal Speed*."

- 8:58:03 a.m. Amtrak Train #86 met Amtrak Acela #2103, who was operating southbound on No. 3 track. Amtrak Train #86 Engineer acknowledged the Acela.

- 8:58:30 a.m. Amtrak Train #86 passed Seabrook Passenger Station (MP 124.7) at MAS and did not stop.

- 9:00:06 a.m. Amtrak Train #86 passed a whistle board erected on No. 1 track just south of BOWIE interlocking without sounding horn. The on-track briefing specified a whistle board erected at MP 121.9, and the forward facing video confirmed.

- 9:01:04 a.m. Amtrak Train #86 passed a shunting barricade erected on No. 2 track, just outside the northern limits of BOWIE Interlocking. The on-track briefing, Line 5(a) specified that a barricade was erected on No. 2 track at BOWIE, and that the out-of-service limits were between BOWIE and the 12W Switch at GROVE.

- 9:01:05 a.m. MD Route 197 (MP 119.5) overhead bridge first came into view from the cab of Amtrak Train #86, along with an MW RMM De-clipper parked on No. 2 track. This de-clipper was referred to as the 1st De-clipper, as there were two (2) de-clippers in the line-up. This 1st De-clipper was about three (3) cat poles south of the Route 197 overhead bridge. Amtrak Train #86 engaged the horn with two (2) long blasts as it got closer to the bridge.

- 9:01:26 a.m. An MW RMM De-clipper parked on No. 2 track came into view. This De-clipper was referred to as the 2nd De-clipper. At this point, Amtrak Train #86 was traveling at over 146' per second (roughly 1 cat pole per 1.8 seconds), or 2200 feet (roughly 8 cat poles) in 15 seconds. Approximately three (3) catenary poles past the 1st De-clipper, three (3) track workers who were standing in the gauge of No. 2 track came into view, along with a Watchman who was posted on the northern end of Bowie State Station platform, directly opposite the three (3) track workers. This Watchman has been generally referred to as the 1st Advance Gang Watchman.

- 9:01:32 a.m. Amtrak Train #86 approached and passed Bowie State Station platform (MP 119.46) and continued to activate his horn. The 1st Advance Gang Watchmen is standing on the northern end of the platform holding a white Watchmen disc with his right hand, in the air at arm's length. In his left hand was an air horn. This Advance Gang Watchmen is clearly observing the approaching northbound Amtrak Train #86 and providing Train Approach Warning. The three (3) workers who were standing in the gauge of No. 2 track (out-of-service) opposite the Advance Gang Watchman were also observing the approaching train. The three (3) workers in the gauge of No. 2 track waved to the Engine.

- 9:01:35 a.m. Amtrak Train #86 passes an MW clipper that was parked on No. 2 track. This clipper was running, a yellow strobe on the clipper's roof was visible and several employees were sitting

inside. The headlight of the southbound MARC #421 operating on No. 1 track came into view. The MARC train was braking to make a station stop at Bowie State Station. Amtrak Train #86 continues engaging its horn.

- 9:01:37.6 a.m. Amtrak Train #86 passed a 2nd Advance Gang Watchman, the 2nd Watchman was posted beside a catenary pole on the east side of No. 1 track, and three (3) catenary poles to the north of the platform and of the 1st Advance Gang Watchman. The distance between the 1st and 2nd Advance Gang Watchmen was at least 790'. At the MAS, Amtrak Train #86 would have covered the distance between these two (2) Watchmen in about five (5) seconds. It appeared as though this 2nd Advance Gang Watchman was standing on the base of a catenary pole, shielding himself behind the pole to the North side. He was holding a Watchman's warning disc in his right hand, in the air and visible. It was also clear that he was aggressively blowing a Watchman's air horn with his left hand. From his position this 2nd Advance Gang Watchman was only about 6' from fouling the No.1 track.

- 9:01:40.5 a.m. Amtrak Train #86 met MARC #421 who was operating south on No. 1 track. This caused a "Double Bubble".[7] A group of 4 workers in the gauge of No. 2 track came into view. 3 of the workers were facing north and walking in a northward direction. 1 of the workers was standing still and facing East, possibly observing Amtrak Train #86. Additional workers and work equipment could be seen ahead on No. 2 track. The orange clothing was readily visible; however, the yellow Watchmen's vests were not as visible, in fact they seemed to blend in with the surroundings making the Watchmen somewhat obscure.

- 9:01:41.5 a.m. Amtrak Train #86 passed a group of two (2) more workers. Additional workers and maintenance of way equipment could be seen ahead on No. 2 track. A Watchman was visible standing on the east side of No. 1 track. This 3rd Watchman is standing still, a Watchman's disc in his right hand held over his head and over the field side rail of No. 1 track. The 3rd Watchman is generally referred to as the Gang Watchman and he was posted directly across from a rail heater and tool cart parked on No. 2 track He was posted approximately 2 1/2 catenary pole spans (almost 662') to the north of the 2nd Advance Gang Watchman (NTSB Factual Report, page 8).

[7]Double Bubble is a term commonly used by Amtrak MW workers to describe a hazardous condition that occurs when two (2) trains approach a location at the same time.

- 9:01:41.9 a.m. Amtrak Train #86 continues to activate train horn while passing a group of four (4) more workers in the gauge of No. 2 track, including the Foreman/EIC. A worker appears to be pointing or motioning towards No. 1 track. The MARC train was still operating south and preparing to stop at Bowie State Station southbound platform. The 3rd Gang Watchman was standing on the outside edge of the ties and was not moving, still holding the Watchman's disc above his head and over the field-side rail of the No. 1 track.

- 9:01:42.2 a.m. The 3rd Watchman was not standing in a predetermined place of safety but was in the foul of the No. 1 track. He was facing west, in the direction of the four (4) workers who were in the gauge of No. 2 track. The Engineer of Train #86 grabbed the independent brake handle and pushed it to stop. The Engineer then pushed the train brake into emergency.

- 9:01:42.4 a.m. At 100.7 mph, Amtrak Train #86 struck the Gang Watchman. Amtrak Train #86 was adjacent to the fifth car of southbound MARC Train #421 on No. 3 track, which had six (6) cars and two ()2 engines, one in front and one in the rear. Amtrak Train #86 went into emergency.

- 9:01:42.5 a.m. A Welder was seen standing on the south side or rear of the welding truck which was occupying No. 2 track. The Welder was facing south and the point of impact was in his direct line of sight.

- 9:01:43.1 a.m. Amtrak Train #86 passed the trailing locomotive of the MARC Train #421. There were additional pieces of maintenance of way equipment in the distance on No. 2 track and one (1) additional worker visible with the equipment, all facing south.

- 9:02:15 a.m. Amtrak Train #86 passed multiple workers who were 12 ½ catenary poles or roughly 3,500' from the POI on the east side of No. 1 track in a predetermined place of safety. These were employees assigned to the surfacing unit which was separate and apart from the Rail Destressing Operation.

- 9:02:28 a.m. Amtrak Train #86 came to a stop.

At this point, Amtrak Train #86, Engine 625 was stopped 3610' from POI and two (2) cat poles (MP 118.7) south of Gang Y-222, a surfacing unit that was working on No. 2 track. This surfacing unit had its own Watchmen, its own briefings and Foreman, and its own support staff, including some who were on

the access road west of No. 3 track near a bus and trucks, apparently having cleared for the southbound MARC #421. This group of workers began approaching Train #86, Engine 625, which was south of the surfacing gang.

History of Hot Spots

On March 13, 2008, a terrible accident[8] occurred in Providence, Rhode Island, when a train struck and killed a former Amtrak manager and badly mutilated a BMWED track foreman. The NTSB generally determined that the probable cause in this accident was an insufficient number of Watchmen. A joint Labor and Management internal investigation determined that staffing inadequacies were the basis of ongoing and bitter arguments at on-track briefings. The parties agreed that these conflicts could be largely resolved if we jointly determined how many Watchmen would be needed at the various locations on the railroad and publish these findings.

In 2008-09, a collaborative effort was made by Engineering Unions and management to identify and catalogue every curve and Hot Spot on the corresponding railroad subdivisions. This Hot Spot committee performed stop watch and whistle tests, establishing data to be used in publishing a Hot Spot manual, illustrating known Hot Spots by geographical name and mile post, and listing the number of Watchmen required for each individual Hot Spot given the most ideal conditions.[9] The tests to establish the number of Watchmen required at each location were performed during the most ideal daylight hours, clear weather conditions and no machinery on the track. The findings are called recommendations because if conditions are less than ideal additional Watchmen will be required. Amtrak distributed this data to Engineering Department employees by including it in the Roadway Worker Protection (RWP) manual, and perfunctory training was provided in this connection.

[8] NTSB Accident DCA08FR004
[9] A sampling of the data included in the Hot Spot manual can be found in NTSB Group Chairman's Factual Report, page 17, figure 3.

It was after this committee published the Hot Spot manual that placards, signage or decals were erected or installed along the right of way. A white diamond shaped reflective decal with an orange spot were placed on the catenary poles on both sides of the right of way in the area of the Hot Spot. The intent of these placards was to make workers instantly aware that conditions exist that will present special considerations when establishing on-track protection including Train Approach Warning.

Typical decal or placard at MP 53.74 denoting Hot Spot due to limited visibility Curves 344-345 on Amtrak's Mid-Atlantic Division

The Hot Spot manual worked well for a number of years and everyone understood it was a product of labor and management cooperation and its purpose was to protect lives. Initially, the Hot Spot manual was published in an 8.5" by 11" format which did not lend itself to field use. It was later published in a format that could fit into the RWP manual.

Amtrak unilaterally abandoned the printing and distribution of the Hot Spot manual in 2014 and, at the same time, removed Hot Spot training from all curriculums and instructions. The BMWED bitterly protested. The placards and decals began to disappear, and Hot Spot recognition began to evaporate.

Since 2014, management has not been agreeable to publish the Hot Spot manual. Amtrak's legal department has insisted that big disclaimers be put on the cover of the book and this causes new Amtrak managers, usually with no experience working on the railroad and with no history of how the Hot Spot data was developed, to focus upon the disclaimer rather than the important information it contains. The training department refuses to teach about Hot Spots in RWP classes. Amtrak has had Chief Engineers who stated that the Hot Spot book is no longer relevant because it was published in 2009 and today's infrastructure is not the same. The Northeast Corridor has had the same basic infrastructure for 150 years while train speeds have dramatically increased.

On April 24, 2018, the work being performed was located between back-to-back Hot Spots. There was a Hot Spot at Curve 404, near MP 119.7, and another Hot Spot at Curve 403 at MP 118.4. The fatally injured employee was struck at MP 119.2. These Hot Spots were not marked with placards or decals.

Curve 404 is a left-hand compound curve ranging between 0.48° to 0.56°, and approaching the POI from the south, Train #86 traversed track with a descending grade from MP 120 to MP 118.

The Foreman/EIC who gave the on-track briefing and posted the Watchmen was hired during the Hot Spot black out period. Therefore, he received no training or testing and his awareness concerning Hot Spots was sub-par as evidenced in his interview. However, when questioned about the work location in relation to Hot Spots, he answered: "*Due to the station I always consider it a hot spot. I always would. The station, the speeds around those and the curve. No matter if it was on the book or not, I always consider it a hotspot. It's just, there's so much that goes on in that little section that, whether it was on the book or not, I just consider it a hotspot." "As far as I know, it's not, but I'm not 100% sure."* (April 25, 2018 NTSB Interview with Foreman/EIC, pages 50-51).

Likewise, the three (3) Watchmen, which includes the fatally injured Watchman, were all hired during the Hot Spot black out period. The average tenure of the workers who were assigned to the Undercutting Operation and the Rail Destressing Operation generally had less than three (3) years[10] service, meaning most of the workers assigned to the subject work were hired during the Hot Spot black out period. Hot Spot awareness with the Undercutter Group was not a dominant focus.

The Undercutter RWIC was interviewed[11] and spoke to the topic of Hot Spots and the decals or placard warnings.

> *Q. "And you are aware,… that there were hotspots on Amtrak's Northeast Corridor?"*
>
> *A. "There was at one time. As far as my, understood it. They weren't put in the RWP book again at -- the last one, I don't think. When RWP book changed in -- with the January before that going into April, I don't think the hotspots were in there. Or at least they all weren't put in the book."*
>
> *Q. "…are hotspots… identified somehow? Are they marked?*
>
> *A. "Yeah…There were signs on the post with the orange disk in the middle, or red disk…. I know they were posting a lot of them one time, back in 2010. Like I said, I'm not even sure they weren't taken down. I'm not sure."*

[10] Amtrak's Force Account for April 24, 2018 for Gangs Y-202, Y-202A, Y-212, Y-222, Y-222A, and Y-242.
[11] December 13, 2018, RWIC interview, pages 21-22.

Fatality Injured Employee

The fatally injured employee was a 20-year old male hired by Amtrak on 8/10/2017. Initially, he was assigned as a trackman with Amtrak's Track Laying System Operation, where he spent the majority of his short career. He was assigned as a Trackman to Amtrak's Undercutting Operations in March 2018, and had worked with that group less than a month before the fatal accident. On the day of the accident, he was assigned as a Gang Watchman for Gang Y-242. He had been trained on Amtrak's RWP Rules, was Watchman qualified and had previously been assigned as a Watchman. His training and qualification summary record illustrated training history from between 7/31/2017 to 2/16/2018 (listed chronologically):

8/10/2017	2-Week New Hire Class
11/29/2017	Qualified as a Watchman, Initial Watchman Training Program, 3301 (Watchman Qualification Signature Form) Submitted, Watchman Qualified-card issued and entered into SAP
2/12/2018	Annual RWP Qualification Class
2/13/2018	AMT-II
2/16/2018	Initial NORAC

Watchmen

Interviews with the workers, including the two (2) Advance Gang Watchmen, provided the understanding that there were only three (3) Watchmen posted at the time of the accident. The forward facing video from Amtrak Train #86 confirmed that there were only three Watchmen posted at the time of the accident. Traveling south to north, as was Amtrak Train #86, we see the first Watchman, an Advance Gang Watchman, posted on the northern most end of the northbound Passenger Platform at Bowie State Station. Investigators determined that this Watchman had roughly 16 catenary poles of sight distance or about 4,200 feet looking to the south. For No. 1 track, this equates to about 27 seconds of warning time for trains approaching from the south at a MAS of 105 mph. For No. 3 track, this equates to about 22 seconds of warning time for trains approaching from the south at a MAS of 125 mph (NTSB Factual Report, page 8).

The next Watchman in line was the second or middle Advance Gang Watchman, and he was posted three (3) catenary poles or about 795 feet north of the southernmost Advance Gang Watchman who was posted on the platform. Investigators determined that this 2nd Advance Gang Watchman was standing to the east

or field side of No. 1 track and had roughly 14 catenary poles of sight distance or about 3,700 feet looking to the north. For No. 1 track, this equates to about 24 seconds of warning time for trains approaching from the north at a MAS of 105 mph. For No. 3 track, this equates to 18 seconds of warning time for trains approaching from the north at a MAS of 125 mph (NTSB Factual Report, page 8).

The 3rd Watchman in line was the fatally injured Gang Watchman and he was posted about 2 ½ catenary poles or about 662 feet north of the 2nd or middle Advance Gang Watchman (NTSB Factual Report, page 8). This Gang Watchman was standing to the east or field side of No. 1 track, directly across from the Welding Gang that was working on No. 2 track. The Gang Watchman's duties were to provide Train Approach Warning for the Welding Gang and was to clear up with the Welding Gang.

RWP 329 (c)(9) provides that: "Gang Watchman and Advance Gang Watchman must: When noisy machinery or equipment is in use or any noise that may interfere with detecting train approach warning, a tap man or other precautions must be taken."

A Tap Man is typically positioned with workers who are using noisy equipment, such as rail saws and grinders, and the nomenclature grew from a Watchman who physically "taps" a worker to warn of train approach. Tap Men are typically posted "at arms-length" from workers so engaged. Had the fatally injured Watchman been assigned as a Tap Man positioned with the workers, at arms-length, then there would have been no need for him to stand precariously on the edge of No. 1 track.

Site-Specific Work Plan

A review of Amtrak's Site-Specific Work Plan (SSWP) disclosed very little information in connection with safely protecting roadway workers on adjacent tracks, and only brief mention of Hot Spots.

> "This plan specifically addresses the undercutting between MP - 120.5 Bowie track - 2 to MP - 112.2 Grove Interlocking. The Mid Atlantic Division Track, C&S Division, B&B Production and ET Departments along with Undercutter forces will be engaged in specifically coordinated work activities. The forces will be deployed to accommodate the need and function of different work crews were safety of the employees is first priority. The project will start in a Hot Spot territory where extra watchmen will be required, to effectively provide the required (RWP) protection to the employees. The forces will be adjusted to meet the RWP requirement accordingly." (Amtrak's Site0Specific Work Plan, page 5)

Amtrak's SSWP for the project had very little safety information that pertained to the hazards of trains traveling at 100 mph past work crews. The SSWP did not list any special hazards, safety precautions or special instructions on protecting roadway workers on adjacent tracks by means of exclusive track occupancy or Slow By restrictive speed orders. The SSWP did make reference to Slow By's stating: "The Undercutter will require an 80 MPH slow by on the adjacent tracks 1 and 3 when requested by the MW employee in charge." The Foreman/EIC, the RWIC, did not know that he could request a slow-by, and said; "*I was told by somebody that it, actually it's just the manager's discretion. So the undercutter and the TLM that used to have them are now manager's discretion*." (December 13, 2018, RWIC interview, page 40). It was clear that the RWIC was not made aware of the details contained in the SSWP.

Slow By

There was no Slow By in place for the Rail Destressing work on April 24, 2018. Amtrak Train #86 could have reduced its speed by 25 mph had such restriction been requested and implemented. The maximum authorized speed for No. 1 track at Bowie State Station was 110 mph, with a permanent speed restriction of 105 mph, starting at PW MP 121.0 and ending at PW MP 119.0. Bowie State Station is located at PW MP 119.4.

The workers interviewed all stated that a speed reduction would be beneficial to worker safety. The Manager of Engineering Production said the increased train speeds could be mitigated by using more Watchmen. He also said that it was important to use Advance Gang Watchmen, especially when working on an inside track due to the "double bubble" hazard. The train Engineer said that when the Undercutter was in use, trains could proceed at 80 mph, but he "might do it at 75 or 70." He said that he didn't think that 80 mph was slow enough, "but that's the best they do for them."

The Engineer also said:

> *"…I tend to go through those guys slower than normal, because I've had previous - - not scares, but you get a little antsy. Because it's tight there. It's in the curve. It's tight. And they don't have a lot of side there to be. So, they're usually -- if they're working on track 2, they're all on track 2. You know, they stand in the middle of the gauge in track 2 because trains are going either way. I couldn't do that. They're better men than me."*

The Foreman/EIC, the RWIC, did not know that he could request a Slow By, and said; "*I was told by somebody that it, actually it's just the manager's discretion. So the undercutter and the TLM that used to have them are now manager's discretion*." (December 13, 2018 RWIC interview, page 40). It was clear that the RWIC was not made aware of the details contained in the SSWP, and the tacit admission that Foremen are dissuaded from requesting Slow By's.

Slowing trains down was not a focus of Amtrak's management, and workers were rarely afforded the benefit of speed restrictions. The Foreman/EIC indicated that "*I never got the okay to do it for my gang*." It is readily apparent from the accident investigation record that Slow-By speed reductions are critical to railroad and employee safety, particularly in high-speed territory such as Amtrak's North East Corridor.

Whistle Boards

The forward facing video confirmed that at 9:00:06 a.m., Amtrak Train #86 passed a portable whistle board erected on No. 1 track at approximately MP 121.9, south of BOWIE interlocking. Portable whistle boards are governed by Special Instructions19-S2 and NORAC Rule 19(d). There is no requirement for a Locomotive Engineer to either sound at or when approaching a portable whistle board and Amtrak Train #86 did not. A connected reading and understanding of Special Instructions19-S2 and NORAC Rule 19(d) generally directs the Engineer to sound when first seeing workers or equipment. Portable whistle boards are to alert Engineers of the potential for approaching roadway workers or their equipment on or near the track. The Engineer is to sound a long and a short, followed by two shorts intermittently until the head end of train has passed the roadway workers or their equipment. At maximum authorized speed, Amtrak Train #86 took approximately 28 seconds to travel from the whistle board to point of impact. *"I see that big W boards about Bowie, about (indiscernible) north. The big orange boards. So blow long, blow short. I see the first watchman up there by the south end of the station, and I believe there was one on the station. So I start doing my toot-toot, toot-toot, toot-toot.*" (April 25, 2018 NTSB interview with Engineer, page 6).

The northbound portable whistle board on No. 1 track could have been placed closer to and/or adjacent to the barricade that was erected on No. 2 track or placed to the north of the southbound home signal at BOWIE interlocking. This placement would have closed the gap in time from when Amtrak Train #86 was alerted to when the first Watchman came into view. If Locomotive Engineers were instructed to sound a horn and/or bells at the portable whistle board instead of only being prepared to sound then, in the

instant accident, the Advance Gang Watchman would have had audible warning sooner than was the case. These additional seconds of warning could have made the difference between a close call and a fatality.

Special Instructions 19-S2. PORTABLE WHISTLE SIGNS

> "Portable Whistle Signs are used by Engineering Department employees to provide Locomotive Engineers with advance warning that MW employees are working ahead. These signs have a reflective orange background, are oval in shape (1 foot wide by 2 feet high), and display a black letter **"W"** in the middle. They are placed to the right of affected tracks, and sufficiently in advance of the work area to provide adequate warning.
>
> Engineers observing a Portable Whistle Sign ***on any track*** must sound the engine whistle or horn in accordance with Rule 19(d)."

NORAC Rule 19(d) Engine Whistle or Horn Signals

> "The following are engine whistle or horn signals. The signals are illustrated by "o" for short sounds and "—" for long sounds. The sound of the whistle or horn should be distinct, with intensity and duration proportionate to the distance the signal is to be conveyed. The unnecessary use of the engine whistle or horn is prohibited. Engine whistle or horn signal must be sounded as follows:
>
> (d) — o Approaching Roadway Workers or their equipment on or near the track, regardless of any whistle prohibitions. After this initial warning, sound two short whistle signals intermittently until the head end of train has passed the Roadway Workers or their equipment."

Whistle Tests

Whistle tests are used by Gang Watchmen and Advance Gang Watchmen to insure all workers can hear audible train approach warnings. Watchmen use air horns in conjunction with warning whistles. Air horns can and have failed for a variety of reasons, including mechanical failures or temperature related issues. The whistle is a second layer of audible warning and Watchmen must be posted close enough for other Watchmen and/or the work group to hear the warning whistle. A whistle test confirms that Watchmen are

close enough to hear other Watchmen's warnings in the event horns break down. A Gang Watchman must, for example, be able to hear the next in line Advance Gang Watchman's whistle, even over the noise produced by work. If the Gang Watchman cannot hear the Advance Gang Watchman's test whistle, the tracks must be cleared and remedies applied. Rules requiring whistle tests used in Train Approach Warning can be found in RWP 329, Section C(8), and state:

> "Conduct a whistle test that meets the following conditions:
>
> (i) Positioned at the identified watchman location, as identified and discussed at the On-Track Safety Briefing.
>
> (ii) Before any roadway worker fouls any tracks not protected with working limits
>
> (iii) Performed with the whistle, not the air horn
>
> (iv) Under similar noise conditions as the work will create.
>
> The whistle test is to ensure that all affected roadway workers are able to receive the notification of approaching movement. If any affected roadway worker cannot receive the notification the RWIC must immediately be notified, additional protection is to be provided, and a new On Track Safety Briefing is to be performed and documented."

The investigation did not conclusively determine if the Advance Gang Watchmen, the Gang Watchman and Foreman/EIC participated in whistle testing and, if so, was that testing performed with and without work noise. A logical conclusion would be that after understanding the number and placement of Advance Gang Watchmen and the Gang Watchman, that a whistle test would have alerted to a Train Approach Warning deficit.

Proposed Findings

I. The Foreman/EIC was inexperienced. This was a complex operation that would challenge even an experienced, well-seasoned Foreman/EIC.

II. There were not enough Watchmen posted. The Foreman/EIC unequivocally stated there were four (4) Watchmen for the work area, yet the record shows there were only two (2) Watchmen and one (1) Gang

Watchman posted. The Gang Watchman (the deceased) was posted not in the gauge of No. 2 track with the gang, but he was posted precariously on the field side on No. 1 track. Additional Watchmen[12] should have been posted as to provide warning in accordance with the fifteen second rule.

III. There was likely no whistle test performed by the Watchmen, and certainly no test performed under the noise of work.

IV. There was an overall absence of practical experience or situational awareness in connection with Hot Spots. There was an absence of Hot Spot training, an absence of Hot Spot placarding or warning, and an overall confusion among workers regarding Hot Spot requirements.

V. Watchmen footing was hazardous. Of the three (3) Watchmen, only the Advance Gang Watchman who was posted on the passenger platform had good footing while providing Watchman protections and Train Approach Warning. The other Advance Gang Watchman and the fatally struck Gang Watchman were posted too close to the fouling point on a steep incline of loose ballast to safely perform duties associated with the Gang Watchman and Advance Gang Watchman.

VI. The Site-Specific Work Plan (SSWP) was vague in reference to any form of required train approach warning or RWP protections, and what details the plan provided were not effectively disseminated to the employees.

VII. There were no Slow By instructions. Amtrak Train #86 did not reduce speed as would have been provided by published Slow By instructions. But it could have, and the Foreman did not know he could request a Slow By.

VIII. There is an absence of effective training and the post-training mentoring that would challenge the consciousness of an immature workforce in a way to reduce accidents.

IX. There is an absence of a just and mature safety culture at Amtrak and a resultant lack of communication, collaboration, cooperation, and trust between labor and management.

[12] Noteworthy is the fact that when the NTSB investigators conducted Site Distance Evaluation testing, seven (7) Watchmen were used in addition to a tap man who accompanied the investigation team.

X. Drugs or alcohol or the use and distraction of an electronic device played no role in the severity or cause of the accident.

Proposed Probable Cause

BMWED proposes that the probable cause of the accident on April 24, 2018 was Amtrak's failures to utilize and enforce the use of Watchman/Lookouts and the predetermined place(s) of safety (PPOS), and the related failure of seriously developing and administering Watchman and Foreman training and mentoring.

There were numerous contributing factors implicated in the accident including:

(1) The inexperience of the Foreman /EIC in overseeing such a complex and unfamiliar operation;

(2) The failure of Amtrak to have a written program of instruction, criteria, and training for Hot Spots that promotes hazard awareness;

(3) The failure of Amtrak to improve Engineering employee training and mentoring concerning RWP, Watchman protection, the placement of Watchman and Hot Spot requirements.

(4) The failure of Amtrak to implement a Slow By speed restriction;

(5) The failure to conduct and observe proper whistle tests;

(6) The absence of secure footing for Watchman/Lookout; the footing would have been better had the 2nd Watchman stood either in the access road east of No. 1 track, or across the railroad to the west of No. 3 track, with the caveat that there would also be an increase in the overall number of Watchmen. The No. 3 track side provided less shoulder and footing than would have been provided on level ground. There was no reason that Watchman protection at this site could not have been crisscrossed throughout the work site, with some Watchmen posted on the east and some posted on the west. The 3rd Watchman or Gang Watchman could have stood in the gauge of No. 2 track, where footing would have been better and the same Train Approach Warnings been facilitated.

(7) Failure to give consideration to the proper whistle board signage placement and location;

(8) The failure of management to conduct and distribute a comprehensive job hazard analysis, within the context of a broader SSWP, to address Hot Spots and associated protections beyond mere assertion; and

(9) The failure to maintain Hot Spot placards and/or decals.

While any of the 9 items listed above could be seen as the "single point of failure" causing the accident, the insufficient number of Watchmen and their placement ultimately led to Amtrak Train #86 tragically striking the maintenance of way worker. The combination of the Foreman/EIC's and Watchmen's inexperience and Amtrak's lack of training and mentoring, and the deficiencies associated with the SSWP, all would have been mitigated and the accident prevented had the rules governing Watchmen been applied and enforced. Hot Spots should have been identified as a critical safety consideration in any comprehensive SSWP/job hazard analysis, which would have resulted in the Hot Spots being marked or placarded accordingly, alerting all employees of increased hazards. Whistle tests would have alerted the Foreman/EIC and Watchmen that Train Approach Warning protections were spread too far apart. A failed whistle test would require the Watchmen to 1) clear the tracks and 2) re-brief, ultimately posting additional Watchmen. The absence of a strong and mature safety culture at Amtrak relates directly to the absence of a comprehensive safety training program.

On August 25, 2016, the General Chairmen of the three (3) Engineering employee unions (BMWED, BRS and ARASA) were interviewed in connection with the NTSB's investigation[13] of Amtrak Train #89 striking a backhoe at Chester, Pennsylvania. The General Chairmen spoke at length about the lack of a cooperative and collaborative safety culture at Amtrak in recent years, and the generally poor relationship between labor and management. They also spoke about training and experience levels of the Engineering workforce. In response to an interview question regarding the state of safety and training at Amtrak, BMWED General Chairman Jed Dodd stated:

> "*What we're afraid of is the inexperience foreman on the job site, the lack of training, the lack of mentoring, the confusion over some of the rules, we think another accident is virtually guaranteed. And so, when you ask me, are things better? Things are better since the Chester*

[13] NTSB DCA16FR007

accident, because we [the union]made a decision that while work with this management is impossible, this management is not going to work with us, so we have to adopt our own program, and we've trained over 400 people in two-day training classes, to go out on the property and organize on the job site around these rules." (Interview with Labor Panel, pages 61-62)

In response to a question regarding what should be done on Amtrak to improve safety and labor/management collaboration on safety issues, BMWED General Chairman Dodd offered a number of comments and solutions including:

"*I would then begin to address the gorilla in the room, and that's like 200 foreman out on the job sites with less than five years' service , and then I've gotta really spend some serious money in terms of mentoring and training out on the property to try to merge the inexperience with training with the job site in a way that would reduce the accidents and the problems out on the property. So, I would make a significant investment in the employees in terms of mentoring and training."* (Interview with Labor Panel, pages 72-73)

Human error clearly played a significant role in the accident and fatality at Bowie, Maryland. However, appropriate Watchman protection would have prevented human error from manifesting into this horrific train strike. Thus, BMWED concludes that the failure to use the proper number of Watchmen, and the related failure of Amtrak to conduct and administer effective Hot Spot and Watchman training is the probable cause of this tragic accident.

Proposed Safety Recommendations to Amtrak

1. Conduct effective and meaningful training on "Hot Spots", and develop procedures for efficiency testing Engineering employees in connection with Hot Spots. The curriculum should require locational awareness, Watchman requirements and eliminating work risk.

2. Work with the Engineering unions empowering a Hot Spot committee for the purpose of updating and refreshing Hot Spot data.

3. Publish the Hot Spot data across all safety platforms, including RWP and NORAC manuals, and include prologue mandating adherence.

4. Require Hot Spot training in other safety disciplines including Physical Characteristic training and testing and in RWP training and testing.

5. Require that Foremen/EIC and Dispatchers discuss any Hot Spots located within the out-of-service limits or area where foul time is being requested. In such cases, the Dispatcher must withhold making the foul time effective or issuing Form D authority until Hot Spot awareness is verified between the parties.

6. Immediately restore, remediate or otherwise maintain Hot Spot placarding along the right of way. These Hot Spot placards are to correspond with Hot Spot identifying data included in the RWP manual.

7. Effectively train, emphasize and enforce the rules requiring whistle tests and to invigorate training and safety observances in that connection.

8. Require that employees must have two (2) years of service before applying for Watchmen training, and that there be annual training and efficiency testing for Watchmen whose syllabus includes but is not limited to Hot Spots, whistle tests, and SSWP's.

9. Immediately modify rules governing Slow By Speed Restrictions by lowering the speed reduction to 25 mph, and appropriately publishing those modified rules, and when during a continuous and planned track outage, or as deemed necessary by the Roadway Worker In Charge (RWIC) or appointed Engineering Department representative, a 25 mph Slow By will be issued by Bulletin Order or Form D when required.

10. Require training and develop procedures for efficiency testing on Slow By Speed Restrictions in other safety disciplines including NORAC, Physical Characteristics, and RWP.

11. Review and improve Engineering employee training in the delivery and conduct of job briefings and On-Track Safety Briefings concerning the placement of Watchman protections and Hot Spot requirements.

12. Develop a Site-Specific Work Plan (SSWP) for every continuous track outage. SSWP's will include a focus on Watchman protections and Hot Spots, and widely disseminate the information contained in the plan to the workers who will be assigned to the work covered by the plan.

13. Assure that inexperienced employees, especially new Foremen/EIC, are properly trained, field-mentored, and supported with sufficient oversight during the process of gaining requisite experience and knowledge.

14. Review and improve Engineering employee training programs and delivery (i.e., content, duration, knowledge transfer, and applicability). Assure that trainers have practicable and relevant field experience in the areas and subject matter they are teaching. Assure that all trainers understand adult learners and employ adult teaching techniques.

15. Work with the Engineering Unions in a cooperative and collaborative manner to improve safety culture and railroad safety, enhance the effectiveness and utilization of the safety liaisons, and maintain a mutually acceptable, non-punitive, close call reporting system for Engineering Department employees.

16. The northbound portable whistle board on No. 1 track could have been placed closer to and/or adjacent to the barricade that was erected on No. 2 track or placed to the north of the southbound home signal at BOWIE interlocking. This placement would have closed the gap in time from when Amtrak Train #86 was alerted to when the first Watchman came into view. If Locomotive Engineers were instructed to sound the horn and/or bells at the portable whistle board instead of only being prepared to sound, then in the instant accident the Advance Gang Watchman would have had audible warning sooner than was the case. These additional seconds of warning could have made the difference between a close call and a fatality.

These comments constitute BMWED's proposed findings, proposed probable cause, and proposed recommendations pursuant to 49 CFR §831.14(a)(b). BMWED appreciates the opportunity to participate as a party to this investigation.

Throughout the document, gender-specific terms may be used in order to ease the text flow. Whenever a gender-specific term is used, it should be understood as referring to both genders, unless explicitly stated. This is done solely for the purpose of making the text easier to read, and no offense or sexism is intended.

CERTIFICATE OF SERVICE

I hereby certify, on this date (9/30/19), I have electronically served Mr. Troy A. Lloyd, NTSB Investigator-in-Charge ([redacted]), and the Party Spokespersons listed below, a copy of the BMWED's "Proposed Findings, Proposed Probable Cause, and Proposed Safety Recommendations" in the matter of Amtrak Train 86 Employee Strike on April 24, 2018; NTSB Docket No. RRD18FR006.

Mr. Troy A. Lloyd
NTSB
[redacted]

Mr. James Hurley
FRA
[redacted]

Mr. Carl Fields
BLET
[redacted]

Mr. Roy Morrison
BMWED
[redacted]

Mr. John DeFrancesco
Amtrak
[redacted]

Respectfully,