UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

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Investigation of: *
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WMATA SMOKE AND ELECTRICAL ARCING *
ACCIDENT IN WASHINGTON, D.C. *
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Board Room and Conference Center
National Transportation Safety Board
429 L'Enfant Plaza East, S.W.
Washington, D.C. 20694

Tuesday,
June 23, 2015

The above-entitled matter came on for hearing, pursuant to Notice, at 9:00 a.m.

BEFORE: NTSB BOARD OF INQUIRY

APPEARANCES:

NTSB BOARD OF INQUIRY

CHRISTOPHER A. HART, Chairman
T. BELLA DINH-ZARR, Ph.D., Vice Chairman
ROBERT L. SUMWALT, Member
EARL F. WEENER, Ph.D., Member

NTSB STAFF

KRISTIN POLAND, Ph.D., Hearing Officer
ROBERT "JOE" GORDON, Investigator-in-Charge
JOSEPH PANAGIOTOU, Chair, Panel 1
RUBEN PAYAN
XIAOHU LIU, Ph.D.
JOSEPH GREGOR, Ph.D.
STEVE BLACKISTONE, Chair, Panel 2
JOSEPH GREGOR, Ph.D.
DAVID BUCHER
RICK DOWNS
BENJAMIN ALLEN, Assistant General Counsel

PARTY REPRESENTATIVES

KLARA BARYSHEV, Tri-State Oversight Committee (TOC)[1]
THOMAS LITTLETON, Federal Transit Administration (FTA)
JAMES DOUGHERTY, Washington Metropolitan Area Transit Authority (WMATA)
CHRISTOPHER GELDART, D.C. Fire and Emergency Medical Services (D.C. EMS)
JAMES MADARAS, Amalgamated Transit Union, Local 689 (ATU Local 689)
DABNEY HUDSON, International Association of Firefighters, Local 36 (IAFF Local 36)

WITNESS PANEL 1: State of WMATA's Infrastructure

CLAY BUNTING, WMATA
PAUL MILLER, WMATA
RANDALL GROOMAN, WMATA
MARSHALL S. EPLER, P.E. WMATA
TEDDY KAVALERI, D.C. Office of Unified Communications (D.C. OUC)

[1] The TOC provided clarification to their testimony in a separate document. That document is titled "Tri-State Oversight Committee Review of Hearing Transcripts".

APPEARANCES:

WITNESS PANEL 2: Emergency Response Efforts

DERRON HAWKINS, D.C. Fire and EMS
STEPHEN WILLIAMS, D.C. OUC
SCOTT GOLDSTEIN, Montgomery County Fire and Rescue
RONALD BODMER, WMATA
HERCULES BALLARD, WMATA

I N D E X

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P R O C E E D I N G S

(9:00 a.m.)

CHAIRMAN HART: I would like to call the meeting to order.

Good morning. Welcome to the board room of the National Transportation Safety Board. I'm Christopher Hart, and it is my privilege to serve as chairman of the NTSB and of this Board of Inquiry. I'm joined today by my colleagues, Vice Chairman Bella Dinh-Zarr, Member Robert Sumwalt and Member Earl Weener.

Over the next 2 days, we will hear testimony relating to an accident on the Washington Metropolitan Area Transit Authority's Metrorail system that exposed hundreds of passengers to heavy smoke on January 12th, 2015, resulting in one fatality and dozens of others seeking medical treatment.

In a few minutes, Investigator-in-Charge Joe Gordon will present a summary of the accident. For the NTSB, this accident was very close to home. It occurred beneath this building, and many of the staff here today, including members of this Board, ride Metrorail train directly, as I did, to come here this morning. It underscored a core NTSB position: While we are acutely aware and appreciative of the convenience that mass transit provides, safety is always more important than convenience. Unfortunately, the events of January 12th clearly demonstrated that the attention that was given to safety was inadequate.

As a result of this accident, 86 passengers were transported to local medical facilities for treatment and another 9 passengers sought medical attention, and tragically, 1 passenger died. On behalf of the entire NTSB, I offer condolences to the family and friends of the passenger whose life was lost. We know that nothing can replace your loved one, and we hope that our work will not only serve to answer some of your questions, but will also help prevent this from happening again. For those who were injured, we wish you well during your recovery. And we know that there are family representatives and those who were injured, both present today and also watching on the Internet.

Our objective in this hearing and throughout this investigation is to determine what went wrong so that we can recommend ways to help prevent similar tragedies in the future. We have begun to do so based on the facts that we have found to date.

On February 11th, the NTSB issued urgent recommendations to WMATA, the Federal Transit Administration, and the American Public Transportation Association concerning tunnel ventilation procedures. We also issued a recommendation on June 8 to WMATA concerning potential electrical short-circuiting hazards.

We are also mindful that yesterday was the sixth anniversary of the crash near WMATA's Fort Totten Station that killed 9 people and sent 52 others to local hospitals. While progress has been made on our recommendations stemming from the

Fort Totten investigation, 6 years later, we are still encountering concerns that we addressed in those recommendations.

This hearing will elicit additional factual information about the L'Enfant Plaza accident as part of our ongoing investigation. At a future date, we will issue an accident report that will include a determination of probable cause and any future safety recommendations that are warranted.

NTSB investigations are aided by the participation of the parties. The NTSB designates as parties those organizations or individuals whose participation is necessary in the public interest and whose special knowledge will contribute to the development of pertinent evidence.

At a prehearing conference on June 2nd, the NTSB and the parties to this hearing agreed upon the issues to be discussed today, a list of witnesses who would testify, and the exhibits to which we will refer today. We will be adding additional exhibits to that list of exhibits. Although we are still gathering evidence regarding all aspects of this accident, testimony and questioning in this hearing will be limited to the four broad issue areas that are outlined in the hearing agenda.

Today we will look at the state of WMATA's infrastructure. That will be this morning. This afternoon, we will look at emergency response efforts, because we want not only to figure out how to keep it from happening again, but also how to improve emergency response if it does happen. Tomorrow morning,

we will look at WMATA's organizational culture, and tomorrow afternoon, the Federal Transit Administration Tri-State Oversight Committee efforts to address public transportation safety, in other words, the regulatory oversight.

I will now introduce the parties. As I call the name of each party, I ask the designated spokesperson to identify themselves and their affiliation with the party they represent, and to introduce the others that are seated at the table. I will start with the Tri-State Oversight Commission.

MS. BARYSHEV: Good morning, Mr. Chairman. My name is Klara Baryshev, and I am Chair of Tri-State Oversight Committee. With me is Sharmila Samarasinghe; she is the Vice Chair of Tri-State Oversight Committee. And Joe Tebo, he is a member of Tri-State Oversight Committee. And also, our consultant, Robert Kogan, and Joshu Shih, present.

CHAIRMAN HART: All right. Thank you, Ms. Baryshev.

Federal Transit Administration?

MR. LITTLETON: Good morning, Mr. Chairman. My name is Tom Littleton. I'm the Associate Administrator for Transit Safety and Oversight of the FTA. I'm the party spokesman. Joining me at the table this morning are George Good, investigator with the FTA; Kimberly Burtch, who is our team lead for investigations and data management; and our esteemed colleague and senior counsel, Scott Biehl, Esquire.

CHAIRMAN HART: Thank you, Mr. Littleton.

Washington Metropolitan Area Transit Authority?

MR. DOUGHERTY: Good morning, Chairman Hart, members of the Board. Jim Dougherty, Chief Safety Officer for WMATA. And across from me is Louis Brown, our Assistant Chief Safety Officer. Seated next to him is Louis Viner, who is our Chief of Infrastructure Engineering. Andrew Off is our Director of Capital Programs and Engineering. Darvin Kelly is our General Superintendent of Track and Structures. And to my immediate right is Lynn Bowersox, our Assistant General Manager of Customer Service, Marketing and Communications.

CHAIRMAN HART: Thank you, Mr. Dougherty.

District of Columbia Emergency Medical Services, D.C. EMS?

MR. GELDART: Good morning, sir, Mr. Chairman, members of the Board, my name is Chris Geldart. I'm the Director of D.C.'s Homeland Security and Emergency Management Agency, as well as the Office of Unified Communications. Across from me I have Teddy Kavaleri, who is the IT Director of the Office of Unified Communications; Deputy Chief Derron Hawkins, from the Fire and Emergency Medical Services; Commander Sund, Steve Sund, from the Metropolitan Police Department; Stephen Williams, the Operations Chief for the Office of Unified Communications; and Assistant Chief Eddie Mills from Fire and Emergency Medical Services.

CHAIRMAN HART: Thank you, Mr. Geldart.

Amalgamated Transit Union, Local 689?

MR. MADERAS: Good morning, Chairman Hart. My name is Jim Madaras. I'm the Safety Officer for Local 689. To my right is Marlene Flemmings-McCann, and next to her is Dion Baker. They're both executives at WMATA -- I mean at ATU 689. Thank you.

CHAIRMAN HART: Thank you, Mr. Madaras.

International Association of Firefighters, Local 36?

MR. HUDSON: Good morning, Mr. Chairman. I'm Dabney Hudson, Second Vice President, IFF Local 36, and I oversee all the investigations and fire-related safety issues.

CHAIRMAN HART: Thank you, Mr. Hudson.

I thank all of the parties for their assistance and cooperation with the NTSB investigation thus far. We appreciate your valuable time, and we look forward to working with you further as the investigation continues. So thank you. We know you're doing this on -- you're busy and you're doing this on your work time, and you've got other things to do, but you're helping us get to the bottom of this and we appreciate it.

The order of the hearing will be as follows: First Hearing Officer Kris Poland will follow my remarks with a safety briefing, some scheduling information, and a description of the exhibits to be used during the hearing. We will then turn to Investigator-in-Charge Joe Gordon, who will provide an overview of this accident. Following the overview, we will proceed in sequence through the issue areas that I listed before.

For each issue area, Dr. Poland will introduce NTSB

technical panelists and will swear in the witnesses. The witnesses have been prequalified and their qualifications and biographical information are available on the NTSB website. The witnesses will then be questioned by the NTSB technical panel and then by the spokesperson for each party, and then finally, by us, the Board of Inquiry. After one round of questions, due to time constraints, a second round will be limited to pertinent questions that serve to clarify the record or to address any new matter that was raised in the first round. Please raise your hand, and I will determine whether the issue warrants a second round of questions.

As Chairman of the Board of Inquiry, I will make all rulings on the admissibility of exhibits, the appropriateness of questions, and the pertinence of proffered testimony with the assistance of NTSB General Counsel, David Tochen, who is seated behind me. All such rulings will be final.

I must emphasize that NTSB investigations are, by regulation, fact-finding proceedings with no adverse parties. The Board does not assign fault or blame for an accident or incident. Witnesses should provide only the facts as they understand them, and they may not speculate or give any analysis. Likewise, questions will be limited to the four issue areas that are already described. NTSB participants will not ask and any party representatives will not be permitted to ask questions that call for speculation or analysis or that are related to fault, outside litigation or legal liability in general.

The exhibits contain redactions noted with opaque boxes, which are the result of negotiations between the parties and the NTSB regarding the disclosure of information that is claimed to be personally identifiable, security sensitive, or proprietary information. The NTSB is authorized by statute to disclose information to carry out its mission, but we try to protect confidentiality and proprietary information to the greatest extent possible. While the NTSB has access to all the information, the exhibits disclose to the public relevant materials that are part of the investigation and/or will be discussed at the hearing. A white paper explaining our authority to use propriety information is available on the NTSB website.

Dr. Poland will now provide important safety and scheduling information and describe the exhibits.

Dr. Poland?

DR. POLAND: Thank you, Chairman Hart. Let's start with safety. Please note the nearest emergency exit. You can use the rear doors that you came through to enter the conference center. There is also a set of emergency doors on either stage -- on either side of the stage up front. There's an AED in the lobby.

Next, some courtesy and planning considerations. If you have not already done so, please silence your electronic devices. Please plan for a 30-minute break at 10:30 a.m. and a lunch break from 12:30 to 2 p.m. The 30-minute afternoon break will occur at 3 p.m.

Now let's discuss the exhibits. The exhibits for this hearing are in nine separate groups. The exhibits are identified by group and number. Group A are administrative exhibits and witness biographies used to prequalify witnesses who will testify in this hearing. Group B are NTSB Group Chairman's factual reports. Group C are exhibits related to the first panel in this hearing, "The State of WMATA's Infrastructure." Group D are exhibits related to Panel 2, "Emergency Response Efforts." Group E are exhibits related to Panel 3, "WMATA's Organizational Culture." And Group F are exhibits related to Panel 4, "FTA and the Tri-State Oversight Committee's Efforts for Public Transportation Safety." Group G are NTSB-introduced interview transcripts. Group H are party-introduced exhibits, and Group M are reserved for other miscellaneous exhibits; none have been identified thus far.

In addition, the District of Columbia party recently submitted 12 additional exhibits. Those exhibits have been accepted and will be labeled Exhibit H4 through H15. Following the hearing, they will be shared with the parties and entered into the docket. Also, I believe Member Sumwalt would like to request additional exhibits for the hearing docket.

Member Sumwalt.

MEMBER SUMWALT: Good morning. Dr. Poland, you're right. I would like to enter the final report of the Federal Transit Administration that was dated June the 17th. I'd like to

enter that into the docket, please, as an exhibit. And in addition to that, the companion to that would be the FTA's Safety Directive 15-1, which was issued also in response to the FTA's audit that was completed last week.

DR. POLAND: Thank you, Member Sumwalt. We'll label those Exhibit H16 and H17. And those will be circulated to the parties and also entered into the exhibit following this hearing.

The exhibits entered into the record and any presentations, along with other records of the investigation, become part of the NTSB public docket and are available via the NTSB website at www.ntsb.gov. The public docket is opened as of this morning. Party spokespersons have been provided electronic copies of the public docket containing the exhibits identified above. A transcript of the testimony taken during the hearing will be prepared and entered into the docket as soon as possible.

In addition, Mr. Allen, seated behind me, will keep a list of any documents that are discussed during the hearing that are not currently exhibits in the NTSB public docket. These documents will be submitted after the hearing and entered into the docket. The parties will have the opportunity to submit proposed findings of fact, conclusions and recommendations to the Board of Inquiry after the closing of the hearing. Submissions will be made part of the public docket and will receive careful consideration during the Board's analysis of the evidence and preparation of the Final Report. I encourage the parties to make

use of this opportunity.

Please note that submissions must be sent to the NTSB within 30 calendar days of the closing of this hearing, by July 24th, 2015, and copies must be provided to each of the other parties.

Thank you, Chairman Hart.

CHAIRMAN HART: Thank you, Dr. Poland.

Mr. Gordon will now provide a description of the accident.

MR. GORDON: Good morning, Chairman Hart, Vice Chairman Din-Zarr, Member Sumwalt, and Member Weener.

On January 12, 2015, about 3:15 p.m. local time, Washington Metropolitan Area Transit Authority, referred to through this presentation as WMATA, Metrorail Train 302 stopped after encountering heavy smoke while traveling southbound in a tunnel between L'Enfant Plaza Station and the Potomac River Bridge. This presentation will provide factual information of the investigation to date.

In a moment, I will play an animation to provide an overview of the accident, but first, I will give a brief description of third rail power used on the WMATA system. Train propulsion power on the WMATA system is supplied from electrified contact rail with 750 volts of electricity. The contact rail, also referred to as the third rail, is located parallel to the running rails. The third rail is typically shielded by a cover

board. High voltage cables are used to provide power to the third rail and maintain continuity.

This still image is shown to help prepare you for an upcoming animation. The image shows a portion of the map from the WMATA Metrorail system. The animation will show events that occurred on the Yellow Line. System direction north is toward the top of the screen. Certain events will be displayed to the right of the animation to document the duration of the accident. The following animation and footage from a WMATA surveillance video present factual information gathered thus far in the investigation as a way to introduce some of the issues addressed in this investigative hearing. The investigation is ongoing and this animation is not intended to provide any analysis. Please start the animation.

The accident began with an electrical arcing event associated with power supplied to the third rail of track number 2 in the Yellow Line tunnel about 2,000 feet south of L'Enfant Plaza Station. At 3:05, a smoke alarm activated near the location of the electrical arcing.

At 3:06, an electrical circuit breaker tripped and remained open on a circuit feeding power from L'Enfant Plaza Station to the third rail of number 2 track. However, power was still being supplied to the third rail from an electrical feed south of the arcing area.

During a review of surveillance video footage, smoke was

first seen coming from the tunnel into the station at 3:09. Southbound Train 302 stopped at 3:13 to service the L'Enfant Plaza Station, allowing passengers to exit and board the train. About 40 seconds later, the train proceeded south, entering the tunnel.

Train 302 stopped in the tunnel at 3:15 due to a heavy accumulation of smoke that restricted the operator's visibility. The rear of the train was about 386 feet from the station.

Due to reports of smoke in the L'Enfant Plaza Station, the WMATA control center sent a command to activate ventilation fans in the station in emergency exhaust mode at 3:16.

At 3:17, the operator of Train 302 contacted the WMATA control center and reported that the train had encountered heavy smoke and was unable to continue south.

In response to a civilian 911 call at 3:18 reporting smoke coming from the ventilation shaft opening near Water Street, first responders were dispatched to that location at 3:22. Also at 3:22, WMATA notified the D.C. Office of Unified Communication of smoke in the L'Enfant Plaza Station.

Southbound Train 510 stopped at the L'Enfant Plaza Station at 3:23. All passengers and the train operator exited the train.

The WMATA control center sent a command at 3:24 to activate fans in the ventilation shaft south of the station in emergency exhaust mode.

At 3:26, the D.C. Office of Unified Communication

dispatched first responders to the L'Enfant Plaza Station. D.C. first responders began arriving at the station at 3:31.

Third rail power to number 1 and number 2 track was de-energized in the station at 3:40; however, power was still being supplied from an electrical feed south of the arcing area.

At 3:49, the WMATA control center sent a command to de-energize the third rail power supplied from south of the arcing location, finally removing all power in the area where the arcing occurred.

Firefighters reported to incident command at 3:50 that they had arrived at the rear of Train 302. Incident command responded to proceed with an evacuation.

At 4:27, firefighters reported to incident command that all passengers were evacuated from Train 302 in the tunnel.

This is video from a surveillance camera inside the L'Enfant Plaza Station. The camera is facing southbound toward the tunnels for Metro's Green and Yellow Lines. The video is played 10 times faster than real time.

Smoke was first seen coming from the tunnel at 3:09 near the station platform. Shortly thereafter, the smoke had dissipated.

Southbound Train 302 stopped at 3:13 to service the L'Enfant Plaza Station, allowing passengers to exit and board the train. About 40 seconds later, the train proceeded south, entering the tunnel.

Event-recorded data shows Train 302 stopped at 3:15. At this time, the last car was about 386 feet from the end of the L'Enfant Plaza platform.

Looking at the southbound tunnel, smoke is beginning to emerge. Due to reports of smoke in the L'Enfant Plaza Station, the WMATA control center sent a command to activate ventilation fans in the station in emergency exhaust mode at 3:16. Heavy smoke can be seen coming from the southbound tunnel. Passengers on the platform can be seen evacuating the station.

Southbound Train 510 stops on the platform at about 3:23, 10 minutes after Train 302 was at the platform. At about the same time, a northbound train stops without opening the train doors and then proceeds to the next station.

At 3:24, the WMATA control center sent a command to activate fans in the ventilation shaft south of the station in emergency exhaust mode.

During review of surveillance video, it was noted that 380 people evacuated from Train 302 through the tunnel portal. Eighty-six people were transported from the accident scene to medical facilities. Another nine people sought medical attention. There was one passenger fatality.

NTSB investigators examined the area of the smoke initiation in the tunnel, which was less than one-quarter of a mile in front of stopped Train 302. The smoke seen on the surveillance video resulted from an electrical arcing event near

the third rail. The remaining damaged cables and cover board are shown here.

The NTSB investigation thus far as focused on several issue points, including the state of repair of the WMATA infrastructure, the response of WMATA employees and first responders to the accident, communication effectiveness, both procedural and radio functionality.

In response to the accident, on January 20th, WMATA announced early action items that would be implemented to enhance safety, which include changes to the standard operating procedures, increased frequency of emergency drills, enhanced safety signage on rail cars, increased inspection of electrical components in tunnels, electrical component upgrades and protection, and review of smoke detection capabilities.

Also, in response to the accident, on April 17th, WMATA announced early action items, which include establish an annual maintenance program addressing tunnel lighting, establishing a maintenance crew to clean tunnel walkways, conducting a review of protocols for responding to alarms received in the Rail Operation Control Center, and implementation of a quality audit of the ventilation system testing.

On February 11th, 2015, the NTSB issued urgent safety recommendations concerning tunnel ventilation systems. These recommendations address the functionality and proper use of ventilation fans in tunnels.

On June 8th, 2015, the NTSB issued a safety recommendation concerning electrical short-circuiting hazards. These recommendations address the proper installation of power cable connector assemblies.

As a result of this NTSB investigation, the FTA initiated a safety management inspection of WMATA. They issued a report on June 17th, 2015, detailing the results of a 3-month inspection, which identified 78 corrective actions to address 44 safety findings on the Metrorail system.

Thank you, and this concludes my presentation.

CHAIRMAN HART: Thank you, Mr. Gordon.

Now I will call on the hearing officer, Dr. Poland, to introduce the first panel and to call and swear in the witnesses.

Dr. Poland?

DR. POLAND: Thank you, Chairman Hart.

Can the witnesses for the first panel please be seated?

Director Hall, can you please position the name plates and assist the witnesses? Thank you.

While the witnesses are being seated, I'll introduce the additional staff that are assisting with this hearing.

Mr. Benjamin Allen and Ms. Anne Gawalt are providing legal support, and Ms. Rachel Gunaratnam and Ms. Beverly Drake are handling the audiovisuals. In addition, Mr. Peter Knudson is handling public affairs, and Mr. Mike Crook is assisting -- is providing assistance to the survivors and to the families.

Chairman Hart, the first panel will address the state of WMATA's infrastructure. The panel will address the maintenance of traction power cables, water in tunnels, the tunnel ventilation systems, and the physical communications systems used within the Metrorail system and those used by emergency responders. Witness Panel 1 is composed of the following individuals from my left, nearest the Board Members: Mr. Teddy Kavaleri, District of Columbia, Office of Unified Communications, otherwise known as D.C. 911; Mr. Marshall Epler, WMATA; Mr. Randall Grooman, WMATA; Mr. Paul Miller, WMATA; and Mr. Clay Bunting, WMATA.

The NTSB Technical Panel, starting on my left, is composed of Mr. Joseph Panagiotou, the Panel Chairman, Mr. Ruben Payan, Dr. Xiaohu Liu, and Dr. Joseph Gregor.

I now ask that the witnesses please stand to be sworn. Raise your right hand. Please answer by saying I do.

(Witnesses sworn.)

DR. POLAND: Thank you. Please be seated.

Chairman Hart, these witnesses have been prequalified, and their respective experience and qualifications appear in the docket as exhibits in Group A. As a reminder to the witnesses, please push the microphone button to talk, and then push it again when finished. Also, please answer the questions factually and avoid analysis.

I now turn the questioning over to Mr. Joe Panagiotou.

MR. PANAGIOTOU: Thank you, Dr. Poland.

Good morning, Panel 1 witnesses. We will begin this panel this morning with a discussion of traction power cables. I'll now turn it over to my colleague, Mr. Ruben Payan.

MR. PAYAN: Thank you.

Good morning. As Mr. Panagiotou stated, the first topic we're going to cover is traction power cables used by WMATA in their third rail power propulsion system. So the bulk of my questions are going to be directed to you, Mr. Paul Miller. So we'll begin.

Mr. Miller, does WMATA or the cable manufacturer assign a life cycle to the cables used for the third rail? And if so, what is the life cycle for the different cables currently in use?

MR. MILLER: Sir, the manufacturers, or the providers of the cable, will not provide a service life of the cable. That is due to the manufacturer does not know what type of stress or environment that we're putting the cables under, so they have no way of knowing exactly what the condition of that cable or what kind of stress it's going to be given to.

In regard to the Metro or WMATA service life of the cable, it's extremely variable. What I'd like to do is when you go into the history of these cables, it's very important to know how these cables are manufactured because, like any product, if you have an outstanding product, the service life is going to be extended.

CHAIRMAN HART: Mr. Miller, would you pull the mike a

little bit closer, please? Thank you.

MR. MILLER: So as our quality continues with the cables, it's important to know how these cables are constructed. These cables, as they exist right now, are low-smoke, zero halogen cables. Their history in WMATA, in the original construction, these type of cables did not exist.

In the mid- to late 1970s, we had a flame retardant-type cable that was introduced. In the 1980s, we had a low-smoke cable that was introduced that WMATA continues to use. In the late 1990s and the early 2000s is where we come into the actual cable that we're talking about, which is, again, is a low-smoke, zero halogen cable.

These cables are put under -- before they even get to Metro, these cables are put under severe testing. This testing will include bake tests, burn tests, water immersion tests. They will include water absorption tests. There's a whole list of tests that have to be performed. This cable is a two kV cable. So --

MR. PAYAN: If I could stop you there. We'll get into the cable testing itself in a little bit.

MR. MILLER: Okay.

MR. PAYAN: Can you just briefly describe the process that WMATA currently uses to monitor the third rail cable integrity?

MR. MILLER: The third rail integrity of the cables --

is that currently, sir?

MR. PAYAN: Currently, yes, sir.

MR. MILLER: We use what's called a thermal imagery system. This is a camera that is mounted on one of our trains that periodically, or every quarter, will engross the entire Metro system with recorded observations of the cables. We also have track walkers that will provide reports to us if they see a anomaly out there. We also provide a meggering-type system, as we deem appropriate out in the system.

MR. PAYAN: Now, how often is the thermal imagery conducted?

MR. MILLER: Pardon?

MR. PAYAN: How often is a thermal imagery audit conducted or --

MR. MILLER: Every 3 months.

MR. PAYAN: Every 3 months, okay. And meggering is only as required, you said?

MR. MILLER: I'm sorry, sir. I can't hear --

MR. PAYAN: Meggering is only as required, or when does that happen?

MR. MILLER: Our meggering program, we -- are you speaking currently?

MR. PAYAN: So how does it get required?

MR. MILLER: Okay. Our meggering program will identify certain areas in the railroad that we know of that has a very

harsh working environment. We will revisit those areas in regard to that we know that we will go back and re-megger the cables. We also, if we have a known occurrence or an issue with a particular cable, we will visit that area and we will re-megger not only the cable that's an issue, but every cable in that entire area will also be re-meggered.

CHAIRMAN HART: The term meggering may not be well-understood. You might explain what that means, please?

MR. MILLER: Okay. A megger is an electrical instrument that is used in the electrical field, and this megger, or what we call meggering, is an instrument that is used to measure the resistance between a conductor through the insulation layer to a known ground source or a negative reference.

MR. PAYAN: So to break that down just to make sure we all understand it, meggering would be testing the insulation on the wire? Is that basically correct?

MR. MILLER: No, sir.

MR. PAYAN: No? Okay. Expand, please.

MR. MILLER: You are measuring the insulation resistance to the known conductor. In other words, you're looking for a possible path between the conductor, which is energized or could be energized at a later date, to a known ground source or a negative reference.

MR. PAYAN: Okay. Do you cross-megger to other cables?

MR. MILLER: Do I crosscheck the other cables?

MR. PAYAN: Do you cross-megger your cables, between cables and to ground?

MR. MILLER: No.

MR. PAYAN: Okay. Now, can you give us a brief timeline of previous cable monitoring programs that WMATA has had in place and either discontinued or replaced?

MR. MILLER: Yes. In the 1990s, we had a cable meggering program. And I'd like to point out, sir, that this cable meggering still exists today. In the 1990s, our cable -- we had meggering program. The meggering program was based on issues that originally came up as our system was aging. This program in the late 1990s gave us a very, very clear picture, or a snapshot, of the system in whole. The results of that brought on board a very aggressive and robust cable replacement program, which is in service today; we continue with it. Our cable program is a replacement that's a reflection of this. We do average in an annual given year of 80,000 feet of cable newly installed every year. Along with that meggering, when we install these cables, every single cable that we install is meggered, recorded, with the help of our engineering group, and all the data is collected to assure that every cable's integrity is intact.

MR. PAYAN: Okay. Now, you mentioned that's the current cable replacement program that you were talking about?

MR. MILLER: Yes, sir.

MR. PAYAN: How does WMATA prioritize which lines or

which locations are going to get renewed with this new cable? Is it by age, location, or malfunction reports? Can you expand on that?

MR. MILLER: Yes. It varies. The very, very first priority, and this is second to none, regardless of where we're at in any group in Metro, is absolute safety. So when we take safety into concern, it's in direct proportion to what could be called an issue with a cable or a malfunction. That cable is immediately addressed no questions asked. Now, granted, at the same time, our cable crews are in charge of both the emergency and the cable replacement. So if they're not working on a cable that's a priority -- and again, safety is first; the revenue of this railroad is second. So once we establish that, then they will go into their cable replacement program.

The cable replacement program is based on many factors. Age of the system. If you notice in our cable replacement program, the age of the stations are in direct relationship to where their locations are, which is the inner core of downtown. They are our priority areas. Along with that, we also take into account the requirements of the low-smoke cable versus the new technology that we have. So they both go hand in hand.

MR. PAYAN: So at the time of the accident, the January smoke incident, was the Yellow Line through the L'Enfant Plaza station completed under the cable replacement program?

MR. MILLER: Within the confines of the cable

replacement program, yes, sir, they were. And I'd like to elaborate on that. The L'Enfant Plaza, as Mr. Gordon mentioned earlier, the L'Enfant Plaza area has dual feeds. One is called the Ohio drive traction power. The other one is called the south tie breaker at L'Enfant. Both of them have individual traction power feeds with multiple cables. Both of those areas were replaced in our cable replacement program.

MR. PAYAN: Okay. Thank you. Does WMATA have an estimated timeline for the completion for the entire system for the cable replacement program?

MR. MILLER: Yes, in part. The track feeder cables, we are approximately 75 to 80 percent finished through the entire system in regards to main line. The actual locations from the Red Line to the Shady Grove, our traction power cables are 86 percent complete. Our Red Line to Glenmont is 99 percent complete. Our Yellow Line to Huntington is 99 percent complete. Our Orange Line to New Carrollton is 100 percent. Our Green Line to Greenbelt is 100 percent. Our Green Line to Branch Avenue is 99 percent. Our Blue Line to Largo is 100 percent. Our Blue Line to Franconia is 50 percent. And our Orange Line to Vienna is 60 percent.

But I would like to elaborate on that. When I make those comments, please keep in mind that Metro, as we expand and we add new stations, the new stations, logically, do not have new cables replaced again. So, as an example, Georgia Avenue is a new station. The outer Blue Line with Largo and Morgan Boulevard,

they're new stations. We don't include that in our cable replacement program at this time.

MR. PAYAN: Okay. Thank you. Switching subjects a little. You are assigned to the Force Account Capital Projects Department --

MR. MILLER: Yes, sir.

MR. PAYAN: -- or Division?

MR. MILLER: Yes, sir.

MR. PAYAN: In what regard does your department get involved in WMATA accident investigations, especially in smoke incidents or especially when an arcing event is identified?

MR. MILLER: It's very, very site specific. When you have a smoke event or a arcing event, it has to be identified as to a category of what it belongs to. In other words, you could have -- a smoking event could be as simple as debris, leaves, it could be insulators, and certainly, cables. Our group that I'm assigned to, if it involves a cable or cables for whatever reason, we will investigate it fully to try to find a root cause or what we think is a root cause. Then we will take immediate corrective action to assure that it doesn't occur again.

MR. PAYAN: Now, do you get to see the final report from either safety or TOC, review it, or suggest changes or implement changes for the system?

MR. MILLER: Yes, sir, we do.

MR. PAYAN: You are part of that review process?

MR. MILLER: We're not part of the review process, but this information is given to us through our -- like, during the TOC investigation, we rely on our safety group to mediate these investigations or come up with the conclusions and findings, and then it is handed down to our group.

MR. PAYAN: Okay. Thank you. I'm going to stop right here and pass the questioning over to Dr. Liu.

DR. LIU: Thank you. I will focus on the issue of water intrusion in side Metrorail's tunnel system and direct my questions to Mr. Bunting.

I'd like to first bring up Exhibit C10. This is a photograph of the arcing accident site taken by NTSB investigators the night after the accident. Please bring up Exhibit C10.

The photo shows that there's apparent water intrusion in the vicinity of the arcing location.

Mr. Bunting, could you describe to me, briefly, WMATA's procedures of identifying and repairing water leakage in Metrorail's tunnel system?

MR. BUNTING: Yes, I will. Water leaks are a challenge for our agency, as with all other transit agencies or highway agencies or anybody that has sub-surface facilities, so we are constantly chasing water leaks. And so our crews that are out in the system, our track walkers, our structural inspectors, or anybody who visits or is in the infrastructure can report a water leak. And we have a variety of ways of water leaks to be able to

be reported and to be acted upon, and it is all based on the severity of the water leak.

And our structural group has a -- you know, when they're out doing their tunnel inspections, they categorize water leaks in categories 1, 2's and 3's. Our track inspection group, if the water leaks are affecting infrastructure components, they will categorize the leaks as defects 1, 2 and 3, which are directly correlated with the structural priorities. And they are in a database, and we attack them based on the severity.

And of course, our number one emphasis is always the safe passage of our passengers regardless of the severity of the leak; if it affects safe passage of our passengers, we'll address it immediately.

There are approximately at any given time between 3- to 5,000 water leaks within the system. And it is quite a challenge for us to react to all of them. And our tunnels, our stations, our cut and cover structures all have waterproofing capabilities and a certain amount of waterproofing condition. And simply chasing all these water leaks is a challenge, but we do, do it aggressively. And we repair about 2500 water leaks a year.

DR. LIU: Thank you, Mr. Bunting, for your information.

MR. BUNTING: Um-hum.

DR. LIU: I want to follow up on some of the things you mentioned. Basically, you mentioned two types of procedures. One is reactive repairs and the other type is based on -- repairs

based on preventive maintenance inspections. You mentioned tunnel inspections. Could you tell me what's the frequency of this type of inspection?

MR. BUNTING: Tunnel inspections structurally are done every other year. There are WMATA personnel in the tunnels twice a week walking these areas; they're track inspectors. So they contemporaneously report water leakage to us; anybody can, a train operator, a station manager, a passenger, any person who is in our system can report a water leak, and that water leak can be directed towards the office that's responsible for repairing water -- handling water control. So our leak inspections, essentially, are continuous. And anybody that has a basement understands the difficulty of trying to chase water. And we do. That is -- we are firefighting when it comes to water control and we do it --

DR. LIU: Thank you.

MR. BUNTING: -- on a continuous basis.

DR. LIU: Sorry to interrupt.

MR. BUNTING: No problem.

DR. LIU: So for the repair work, you mentioned that they are in reaction to the track inspections and structural inspections. Is there anything like a regular repair program that you conduct regularly over your tunnel system?

MR. BUNTING: No. We do not have, say, a schedule for tunnel repair. Again, civil-type structures are inspected. They're evaluated to a criteria. That criteria then drives your

repair program, your capital program, your schedule for the year. There's a lot of activities going on in WMATA. A lot of things are -- we're trying to rehabilitate this infrastructure. So tunnels -- like the rest of our infrastructure, we take a look at opportunities. When we're not out fighting, firefighting the most severe leaks that are causing problems with our infrastructure or creating safety hazards to our passengers, we will take advantage of track outages. We will take advantage of other activities, and we try to get as much activity done. We look at this as a time and space effort.

DR. LIU: Thank you.

MR. BUNTING: Water control is just one of the many things we do when we're out there repairing our infrastructure.

DR. LIU: Thank you for the information. I'd like to move on to my next question and focus on the area near the arcing location.

MR. BUNTING: Um-hum.

DR. LIU: From the various reports I have read, water intrusion in this area has been an ongoing, known issue that has been flagged repeatedly in reports dated from 2010 to 2014 and as recent as 3 month before the accident. You have talked about the general process of dealing with water intrusion. What is your strategy of dealing with the persistent, recurring situation like what we saw at the arcing location?

MR. BUNTING: Well, again, water control is quite a

challenge. It is not unusual to have reoccurring water leaks near vent shaft, vent structures. We have 217 vent structures in the WMATA system. Those are structures that penetrate the surface and allow water to either flow into our system or to have a certain amount of recharge.

To answer your question, if we feel that we cannot address the repetitive water issues, we will engage the expertise through our chief engineer's office, and we have done this, and look at doing other methodologies that will solve the problem so that we don't have to chase -- water leaks, as anybody knows, find a way to get into your structure. We stop a water leak in one area through either chemical grouting in this area, where the incident occurred, through packing lead between the panels, it'll go away, the area will dry up, it will come back a year later, and we'll have water leaks again, we'll chase them again.

But if we have a place that has consistent problems, we'll use state of the art methodology. We've done exterior tunnel grouting, we've put in grout collars, we've utilized other methodology to try to control it, and there are times that we just say the best thing to do is divert this water to our drainage system.

You need to keep in mind, and I want to be clear on this, our system was made to allow water to drain to it. And so we focus a lot of our efforts in keeping our drainage system open, our drain channels on the track bed open, to allow the water to be

collected and then discharged from the system. We discharge approximately 2 million gallons of water a day, which in layman's terms, about three Olympic-size swimming pools. So you can see the challenge we have with dealing with water, and we do a variety of things when we have reoccurring issues.

DR. LIU: Thank you. My understanding is that the leaks are really based on their severity. In the past reports, the leak in the concern area has been rated as category 1, which is classified as severe, active leaks that affect -- that may affect crucial components, such as the rail. My question to you is: Do you prioritize leak repair based on their severity?

MR. BUNTING: Yes, we do. And if you look at the history of this particular area, this tunnel section was inspected -- I believe the structural inspection report was signed off in December of '13. A work order was written in March of '14 to address the water leaks, and the water leaks were then addressed in July through a series of repairs, and at that time the area was considered essentially no longer problematic for us.

DR. LIU: Thank you. So you said the last leak repair performed in the area prior to the accident was in July '14; is that right?

MR. BUNTING: To the best of my knowledge, that's correct.

DR. LIU: I don't think I have documents showing that. Could you pass that to me after the hearing, please?

MR. BUNTING: Yes. I don't know if I have a copy of it with me, but I can provide it to you.

DR. LIU: Thank you. I appreciate that.

DR. POLAND: Can you tell me what the title of that document is so that I can be prepared to accept that exhibit after the hearing?

MR. BUNTING: It's just a Maximo work order. I do not have the work order number, but it's a Maximo work order called Tunnel Leak Repair.

DR. POLAND: All right. Thank you.

MR. BUNTING: You're welcome.

DR. LIU: Mr. Miller mentioned in his testimony that some of the work that he does in the cable department, in the power department, does some special things depending on the working conditions; if there's harsh working conditions, there may be some special procedures. And you also mentioned that if it's a recurring, persistent situation, there's some special strategy, special procedures you perform. My question to you is: Do you consider the location of the arcing accident a condition of harsh working environment? And if so, what have you -- what special procedures have you performed to that location?

MR. BUNTING: Given the knowledge of which I know now, I would say, yes, that is an area that we need to focus some additional attention on. Prior to that, I do not believe that that area was severe as it is now. Again, water conditions change

rather dramatically from time to time, and I will give you an example. The day of the incident and the day of the response, the area was, as you saw it, was wet. There was a certain amount of water. However, by the time the repair crews went down there that evening to address the repair to get the service back, there was a rather significant hydrostatic leak in the area bringing a tremendous amount of water into the area that had to be addressed immediately. So that's how these conditions change rapidly in our tunnels.

DR. LIU: Thank you. My next question is: Do you have a tracking system to monitor the status of leaks, for example, when they were repaired and when they started to leak again?

MR. BUNTING: No, we do not.

DR. LIU: Can we bring up Exhibit C19, please?

So this exhibit is a leak monitoring report that was created in 2010, which appears to meet or address the status of leak repairing in that year. So my question to you, Mr. Bunting, is was that a one-time thing or do you still do this?

MR. BUNTING: That is a one-time document. I never saw that document until this investigation. And my understanding from talking to the author, who has since retired, it was his attempt to form a tracking system, but it was never implemented.

DR. LIU: Well, first of all, the document was addressed to you, if you read --

MR. BUNTING: That's correct.

DR. LIU: And if you read the later pages, this document appears to be living throughout year 2010. And could you flip the pages? Scroll down, please. Go to the next page. You can just keep going to the next pages. So this appears to be living throughout the year 2010 and kept tracking the status of leaks of that year. But you said this was never actually implemented and certainly not in effect as of now; is that right?

MR. BUNTING: That is correct, sir.

DR. LIU: Thank you. I believe I'm running out of time. I'm going to turn it over to Mr. Panagiotou. Thank you. Thank you, again.

MR. PANAGIOTOU: Thank you, Dr. Liu.

I would like to begin this topic with a description of the ventilation system and its purpose. The following questions will be directed towards Mr. Randall Grooman.

MR. GROOMAN: Mr. Grooman, can you please provide a brief general description of the tunnel and station ventilation systems?

MR. GROOMAN: Yes. Good morning. WMATA's ventilation system was originally designed in the late 1960s and is comprised of several components. Underground stations have reversible fans that can exhaust air from the station or provide fresh air into the station. The fans can be controlled remotely from the rail operations control center or they can be operated locally as well. At the ends of each station are vent shafts venting to the

outside.

Generally, in the tunnel segments between stations, there are fan shafts that contain anywhere from two to seven individual fans that are reversible. Each fan shaft can be remotely controlled from ROCC or operated locally. We do have one exception. At our Forest Glen Station, the fans can also be operated from either of the two kiosks.

The tunnel fans are interconnected to the vent shafts that are located at the ends of the station. When fans are commanded to run, the fan shaft damper is open and the associated vent shaft damper is closed. On the outer F route, which opened in 2004, we changed the design and went to reversible jet fans, located in the tunnel walls. These are high-powered reversible fans that ventilate only the section of tunnel on the route. Those two are operated remotely and can be controlled locally.

WMATA's ventilation system was originally designed to control temperatures in the tunnels and stations and remove smoke and fumes. Again, at least 75 percent of our stations were designed pre-NFPA 130. However, it was recognized as early as 1976 the need to utilize the fans in case of emergencies. The first agreements were made with the District of Columbia in Montgomery County, Maryland, and formalized the requirement that tunnel and station fans could be remotely controlled and reversible in case of emergency.

MR. PANAGIOTOU: Thank you. So you said that prior to

NFPA 130, so the older sections of the tunnel, the ventilation system was intended for the removal of heat and fumes?

MR. GROOMAN: The original --

MR. PANAGIOTOU: Is that correct?

MR. GROOMAN: Yes. I'm sorry, yes. The original design was for temperature control in the tunnels based on heat loads generated by wayside equipment and heat factors or heat loads generated by moving trains.

MR. PANAGIOTOU: And in the newer segments of the tunnel, those that would be classified as post-NFPA 130, what is the purpose of the ventilation system there?

MR. GROOMAN: As with the older system, as well, they're dual purpose for both emergencies, removing smoke. The newer systems, per NFPA 130, are obviously more powerful fans to meet the CFM requirements of air movement to remove smoke and heat. But they also do ventilate the tunnels, as well.

I'd like to say we constantly use the tunnel fans, almost daily, in our work routines. When we have work crews that are working, we have diesel-powered equipment and locomotives working in the area, we routinely turn on the tunnel fans to ventilate the tunnels to create a clean air work environment. When we do major shutdowns between tunnels or between stations, we put together a ventilation plan which dictates which fans to put in what direction to help ventilate the sections of tunnel where the work is being performed.

MR. PANAGIOTOU: Thank you. Which category does the tunnel where the accident took place fall into? Is it a pre-NFPA 130 or post-NFPA 130 design?

MR. GROOMAN: Pre-NFPA 130.

MR. PANAGIOTOU: Thank you. Would you be able to tell me approximately how much of the tunnel network is pre-NFPA 130 and how much is post-NFPA 130?

MR. GROOMAN: Seventy-five percent is pre-NFPA 130. So it's 75 -- there's 82 fan shafts and 36 jet fans. Seventy-five percent of the tunnel fans, or the vent shaft fans, are pre-NFPA 130.

MR. PANAGIOTOU: Okay. Thank you. I would now like to discuss the ventilation system's performance. So in the past, WMATA had contracted with engineering firms to perform studies on the ventilation system. These studies examined certain existing portions of the Metro that were built prior to the NFPA 130 standard. What was the purpose for conducting these studies?

MR. GROOMAN: To evaluate the existing capacities of the fans in relation to NFPA 130 requirements and the feasibility of making improvements.

MR. PANAGIOTOU: And have engineering analyses like this been done on all of the older segments of the tunnel network?

MR. GROOMAN: At the time of the contract, I believe so, which the first engineering study was performed in 1983.

MR. PANAGIOTOU: Do they cover the entire network,

though, or are they for specific locations that were selected as tests?

MR. GROOMAN: I'm not -- I'd have to go back through the reports to pull that, to find out how many stations were involved.

MR. PANAGIOTOU: If you could get back to us on what -- how much of the network was examined by these studies that I was mentioning, that would be great.

So you mentioned that one of the purposes for these studies was to identify strategies to improve the ventilation system in these older segments which may not have been -- do not have a large capacity and certainly not what would be specified by an NFPA 130 design. So what were the strategies that were identified to improve the performance of the ventilation system?

MR. GROOMAN: There are three strategies identified. One strategy was to use blocking devices to block off a section of tunnel to improve the air flow of the other tubes. Jet fans were evaluated, as well as increasing the capacity of existing fans. So that was the focus of the studies.

MR. PANAGIOTOU: And were any of these strategies implemented in the tunnel network?

MR. GROOMAN: The only strategy that was implemented was with the opening of the Glenmont to -- I'm sorry -- the Wheaton to Glenmont segment of tunnel. They did go back and retrofit two fan shafts to increase the capacities to meet the requirements of NFPA 130. The other devices, it was determined that the blockage

devices, which were basically a parachute design, WMATA took that out of their design criteria because they thought it was, from an operational standpoint, unsafe to have all these devices out in the system, from accidental deployment and storage of these hydrogen tanks that it would take to deploy the parachutes.

I couldn't find any documentation to say otherwise, but the costs associated with the upgrades ranged from a blockage and jet fan upgrade in the order of 16 to $19 million back in -- as late as 1997, I believe. To upgrade all of the existing fans to a higher capacity, the estimate came in at $525 million. So, again, I haven't found anything written or documented why they steered away from it, but I could imagine cost was partially to play in it, as well, with a $525 million price tag.

MR. PANAGIOTOU: Thank you. So for the most part, then, the older tunnel segments that were built pre-NFPA 130, have the original ventilation capacity that they were designed for at that time and no changes have been made?

MR. GROOMAN: Physical changes, no. The standard at the time was the 50,000 CFM exhaust and 35,000 CFM supply. We have found, to improve airflows in the tunnels, we needed to sequence the operation of the fans. In other words, in a given area, place a certain fan shaft in exhaust and put another fan shaft in supply, helps augment the air movement in the section of tunnel.

MR. PANAGIOTOU: Thank you. What division of WMATA was responsible for contracting and receiving the results of the

engineering analyses we've been discussing?

MR. GROOMAN: I believe that was our engineering department.

MR. PANAGIOTOU: And are there any mechanisms in place to help with sharing the knowledge that was gained from these analyses with other divisions within WMATA that could potentially benefit from such knowledge, for example, for the folks who plan emergency response?

MR. GROOMAN: From a maintenance perspective, we're probably poor on the communication. We know on a maintenance perspective in the operation of the fans what works best. That may not have been communicated very well to emergency responders.

MR. PANAGIOTOU: So, for example, in one of the studies, one of the conclusions was, at certain locations, the fans are not capable of reversing the flow and there is essentially only one direction which can be kept relatively free of smoke, so one evacuation route from a specific location. Is that information -- how does that knowledge get transferred to the people who are going to eventually be in charge of orchestrating an emergency? Is there a mechanism internally for sharing that?

MR. GROOMAN: Not that I'm aware of. I'm not -- again, my expertise is not in the emergency response. I'm in the --

MR. PANAGIOTOU: I understand. I was just asking if there was a mechanism for getting it out.

Okay. One of the studies indicated that a means of

improving the effectiveness of the ventilation system in the older portions of the network would be through the reduction of a potential fire size that could occur during an emergency. Now, what steps has WMATA taken towards limiting the fire load in tunnels and train cars?

MR. GROOMAN: The construction of the tunnels use very little combustible materials. It's basically concrete and steel. Our rail cars, their design spec requires rail car manufacturing to comply with specific standards, one of which is to keep flames, smoke and toxic fumes as low as possible. Another example are low-smoke cables in the system. Other than that, there's not a whole lot to burn in a tunnel.

MR. PANAGIOTOU: That covers the tunnel. The train cars, you said they are built to standards that would prevent them from having materials that would be considered -- that would add significantly to a fire load?

MR. GROOMAN: The rail cars are designed for low combustible materials.

MR. PANAGIOTOU: One of the mitigation strategies for lowering the fire load on the train cars in these reports was identified as replacing the windows from Plexiglas to a plate glass. Do you know if that has been done?

MR. GROOMAN: I believe that has been completed, yes.

MR. PANAGIOTOU: Thank you very much. Thank you very much, Mr. Grooman. That concludes my line of questioning for now.

I will now turn the microphone over to Dr. Gregor for his line of questioning.

DR. GREGOR: Thank you. Good morning. I would like to ask a few questions concerning the systems that support radio communications in the WMATA underground. And these will go to Mr. Marshall Epler and Mr. Teddy Kavaleri, variously.

There are two largely independent trunk radio systems servicing the downtown areas of the Washington Metro system, the WMATA comprehensive radio communication system and the D.C. Public Service Radio System.

Mr. Epler, would you give us a brief description of the WMATA system, with emphasis on how the below-ground components work?

MR. EPLER: Okay. WMATA operates a 490 megahertz trunked radio system. Above ground, the radio system consists of an aboveground component, a below-ground component, and approximately 5,000 subscribers. The aboveground system consists of 2 redundant core sites attached to 10 antennae sites that broadcast over a 1600 square mile area. The system is maintainable and suffers extremely few faults.

The below-ground system is an extremely difficult to maintain system. And the way the system works is an RF signal originates aboveground and it's converted into fiber optic signal. The fiber optic signal is routed to the below-ground system, where it is distributed to 26 fiber optic head ends. At these fiber

optic head ends, the signal is converted from a fiber optic signal to an RF signal. The RF signal is coupled into what's called a leaky coax cable. This leaky coax cable is shared between both the WMATA CRCS system and six different public safety agencies at different places throughout the underground.

And what basically happens is when the signal is injected, it goes down the leaky coax cable, and as the signal goes down the leaky coax cable, it radiates an RF signal. And as the signal goes, the conducted level diminishes to a point where it needs amplification. At the point it needs amplification, we place what's called a BDA, or a bidirectional amplifier, at this location. And the purpose of the bidirectional amplifier is to increase the signal level where it is reintroduced onto another section of leaky coax cable.

So, once again, the signal will propagate down the leaky coax cable until it needs amplified, at which point it runs into another bidirectional amplifier. It gets increased again. And this process continues until you hit the end of the segment. It is not unheard of to have more than 10 or 12 BDAs in one of these radio segments.

As the signal is going down, the leaky coax signal, if a station is encountered in the segment, we tap off that signal -- tap off the leaky coax, distributed antenna system, and we will take it and we will run it, antennas and leaky coax cable, to cover what's called the red tile areas in the stations. And

basically, the red tile areas are public access areas of the station. When the system was originally designed, coverage was just required for the red tile. Since then, WMATA has a program underway to expand coverage to the backroom areas of stations so we do have coverage. That's the way the downlink signal works.

Uplink works just the same. You'll take a portable radio. It will couple onto the leaky coax. The signal will go to the BDA, get amplified to the next BDA. It will go all the way back to the fiber optic head end. At the fiber optic head end, it is converted from RF to fiber optic, and it goes aboveground.

Like I said earlier, the system is extremely difficult to maintain. Some of the reasons it's hard to maintain is the leaky coax is a 75 ohm leaky coax cable. Our radio system --

DR. GREGOR: If I could interrupt? I'm sorry.

MR. EPLER: Go ahead. Sorry.

DR. GREGOR: Just to make everything clear, the leaky coax is designed to be that way so that we can receive and broadcast RF as part of the antenna system, as I understand?

MR. EPLER: Yes, sir. It leaks RF energy.

DR. GREGOR: I'd like to stop there and ask Mr. Kavaleri if you could briefly describe the underground portions of the D.C. Public Service Radio System, again, with emphasis on the below-ground portions. And you can just limit your response to the differences between it and the WMATA system.

MR. KAVALERI: The D.C. Public Safety Radio System is a

10-site system. It's a Motorola P25 system, version 7.15. At the time of the incident, it was version 7.13. The system provides over 10 million calls a year. We have over 8,000 radios accessing the system on a daily basis on the District side, as well as interoperable communication capability with some federal partners, as well as the regional partners, all the COG members and regional partners. The system is monitored 24/7, 365 days a year. We have on-call technicians. We have a network operation center that monitors the system and capabilities. The below-ground system, we provide the signal handoff at one of our radio sites to WMATA. WMATA takes care of all the signal transmission, equipment maintenance and upkeep on all the stations within the District.

DR. GREGOR: Okay. I understand you have separate BDAs for amplifying your signal downstairs?

MR. KAVALERI: We don't manage any of the BDAs or any of the system, cables, BDAs, on the WMATA system. Our handoff point is at one of our radio sites. We have a directional coupler specifically designed to provide, you know, that handoff point, the signal handoff point.

DR. GREGOR: Okay. We can follow up on that.

Mr. Epler, who's responsible for the maintenance of the below-ground components of these radio systems, and how is this responsibility assigned? Is it via contract, an MOU, what have you?

MR. EPLER: The maintenance of the below-ground radio

system is handled by our system maintenance com department. The specific mechanism, I could not find any MOU or agreement to why -- who maintains what.

DR. GREGOR: Parameters of the maintenance control? In other words, the standards it's being maintained to?

MR. EPLER: We use a preventive maintenance inspection to adjust the radio system. It's a continual process, and because all the BDAs are strung in a long string, they actually interact with one another. So one of our major maintenance actions is to do what's called the aligning the radio system. And what that means is you change amplifier settings. And when you change amplifier settings, it has an impact on both the signal, as well as noise ratio. And since communication is a function of the signal to noise ratio, it's a delicate balance between the signal and the noise. So one of our primary maintenance actions is to adjust this radio system.

DR. GREGOR: Okay. So could you please describe the ongoing testing and maintenance program used to assess and maintain the health of these systems and to identify when there's a problem to address? And how it existed prior to the accident of January 12th?

MR. EPLER: Me or him? Me?

DR. GREGOR: To you, Mr. Epler, please.

MR. EPLER: Okay. Prior to the incident, it was basically an informal process. If one of the local jurisdictions

tested their system, they would contact our system maintenance radio manager, he would put in a work ticket, and then our system maintenance department would go and troubleshoot and rectify the problem.

Since the incident, we've changed a whole lot of things. The first thing we're doing is the local jurisdictions are testing on either a weekly or a biweekly basis. They have a formal test procedure, where they test different areas within the WMATA system; test the mezzanine, they'll test the platforms, they'll test the tunnel entrances. They will then take this on a once-a-week basis, and they will input this to a webpage we develop. So unlike the past, we get both the good test results as well as the bad test results.

Then the second thing we're doing is, based on the testing, we will generate what's called a Maximo work ticket. A Maximo work ticket is then -- we look at all the Maximo work tickets in the system, and we've animated a map. So on this map, you can tell -- you can now tell areas that have poor radio coverage based on Maximo work tickets.

Then, in addition to that, what WMATA did is they started what we call OAP 105 testing. And OAP 105-3 testing is where our system maintenance technicians will ride the train with some automated test equipment. They'll capture and record the data. Then they'll take that captured and recorded data, they'll take it back to their home office, and they'll work with

engineering and they'll analyze the data. And then based on this analyzed data, this captured data, they will then perform maintenance or do troubleshooting in areas that have problems.

DR. GREGOR: Okay. Thank you.

Mr. Kavaleri, did the D.C. OUC perform any testing and maintenance on the below-ground portions of the D.C. Public Service Radio System? And if so, what were the details of this program?

MR. KAVALERI: Yes. We used to test on a monthly basis. We didn't have the proper protocols, but we were reporting on a monthly basis on any fail locations. Those tests were conducted on individual lines versus what we've done since the incident. Since the incident, we actually test on a weekly basis. Those results are documented with our trouble ticketing system, as well as an email that's sent out to the WMATA maintenance and management team, and we also provide that information on the WMATA provided online Web portal.

DR. GREGOR: Can you tell me how often you make quantitative measurements of important parameters like signal strength, noise level, symbol error rate, that sort of thing, to assess system health?

MR. KAVALERI: Yes. In the last 6 months, we've done two RSSI signal measurements. You got receive signal strength indicators, at all of the locations within the District, both the uplink and the downlink. That's what we've done.

DR. GREGOR: And how is this information utilized once you've taken it?

MR. KAVALERI: Yeah. Initially, what we wanted to do is evaluate if the signal strength was strong enough down in the Metro locations, on the platforms and in the tunnels. That information we provided to WMATA so they could evaluate the below-ground system.

DR. GREGOR: And, Mr. Epler, this OAP 105-P, these are also quantitative measurements?

MR. EPLER: Yes, sir, they are. They're actually recorded by a spectrum analyzer and they're logged.

DR. GREGOR: Can you go into any detail of what measurements you're making and how this information is used?

MR. EPLER: Okay. How is it used? As I told you earlier, the BDAs are in a series of BDAs where they interact with one another. And by riding the whole train down along the tunnels and checking the signal strength, what you should theoretically see on a perfect system is the signal will come out very strong on the BDA. It'll gradually diminish. You'll hit another BDA, the signal will go up, you'll go down, and you'll see this saw-tooth pattern going, you know, as you're riding the train. At places where that saw-tooth pattern does not exist, that gives you some type of indication that the problem is generally located where the pattern changes.

DR. GREGOR: Okay. Now I'd like to switch to the

location where the accident occurred. What routine testing was performed in the L'Enfant Plaza Yellow/Green Line platform areas and in the portal tunnels leading to the Pentagon in the months leading up to the January 12 accident? And Mr. Kavaleri?

MR. KAVALERI: Yeah, before the -- so the District system right before the incident, we have two, an older system and a newer system. We basically operated both systems at the same time during the transition period. We migrated the police department onto the new system back in 2013-2014 timeline. And then in December 2014 is when we migrated Fire and EMS to the new system. So we had both systems operating.

In August of 2014, there was a system-wide test done by Fire and EMS personnel. This was to validate the new system, the new system's operations throughout all of the stations, and most of the stations had passed at that point. And that's the level of testing that we've done.

DR. GREGOR: Okay. I'm specifically referring to the Yellow Line and the tunnel area between L'Enfant Plaza and the Pentagon, actually, where the accident train ended up. That platform and the Yellow Line train testing, is testing -- was testing done in that area, and if so, do you have records for it?

MR. KAVALERI: Yeah, testing is usually done to the L'Enfant Plaza platform location and then anywhere else within the District.

DR. GREGOR: Right. But there's some portion of that

tunnel that lies within the District. You guys don't test there?

MR. KAVALERI: No, not in the past. We started doing that about 2 weeks ago.

DR. GREGOR: But you are testing now?

MR. KAVALERI: Yes.

DR. GREGOR: Then, Mr. Epler, same question essentially?

MR. EPLER: One of the ways WMATA tests the radio system is we have approximately 5,000 subscribers that use the radio system throughout the WMATA underground. When an employee or somebody who's using a radio comes across an area where they do not have radio coverage, they're trained to contact MOC and say we don't have radio coverage in there. At that point, once again, a work ticket is generated, and system maintenance will go out and troubleshoot and resolve the issue. So it's the regular use of radios. If the radios don't work, because we have so many people using it, we're going to know that the radio doesn't work in that specific spot.

DR. GREGOR: Okay. Thank you very much.

And at this time, I'd like to pass the mic back to Mr. Panagiotou.

MR. PANAGIOTOU: Thank you, Dr. Gregor. I believe Xiaohu, Dr. Liu, has some follow-up questions he would like to ask, so I'm going to pass the microphone back to him.

DR. LIU: Thank you.

Mr. Bunting, I just want to follow up on the leak

tracking issue we discussed before I turned it over. So it appears that you experimented something back in 2010 but eventually decided to not establish a leak tracking system. So I suppose you came to the conclusion that you don't need such a system, and you concluded that your current inspection and reactive repair procedures is adequate? Could you -- is that the case? If so, could you elaborate a little bit?

MR. BUNTING: Well, let me clarify for a second because I did misrepresent the issue regarding do we have a way of tracking reoccurring leakage. We have an enterprise maintenance management system in WMATA called Maximo. And on top of that, we have a linear asset database at WMATA called OPTRAM. Both of those work orders and defect tracking records information systems can be utilized to track reoccurring defects. And a leak is simply a defect that's annotated in our work order system.

So to clarify my question, my answer is that we do have a methodology for doing that. That particular report, again, I will say I never saw that report. 2010, I believe sometime during that period, I had left that position where I was in charge of that group and went to another group. So it may have been utilized by my predecessor, but I am not aware of that. But, yes, there is a need to track reoccurring maintenance issues so that if they do become something more than a regular maintenance issue, that we can execute a plan to correct it so we don't have to continually fix the same thing over and over again.

But again, WMATA, as well as all other transit agencies, have a lot of issues with -- have a lot of challenges with water seepage into our system. We've had three blue ribbon panels come to WMATA to look at our water control issues. And so it has been a challenge, and we continually and aggressively fight this particular issue.

DR. LIU: Thank you. Just so I understand you, so basically the way you track leaks, you monitor leaks is through a bigger defect tracking system that tracks all the defects within WMATA's system; is that correct?

MR. BUNTING: That's correct. If a person opens a work order ticket and a correct work order is opened up on that, it would be -- there is a defect. And I will tell you the defect for water leaking is D-48. And that record can be tracked. And if another work order is opened for the same defect in the same general area, we can see these things not only by a list of reoccurring work orders, but with our OPTRAM system, a clustering of defects, which would then -- the maintenance personnel plus the engineering group that supports the maintenance group could take additional actions, if necessary. That's correct.

DR. LIU: Thank you for the clarification and thank you for answering all my questions.

MR. BUNTING: You're welcome, sir.

DR. LIU: That completes my questions.

MR. PANAGIOTOU: Okay. Thank you, Dr. Liu, and that

concludes questioning for Panel 1 for the moment. I pass the microphone back to Dr. Poland.

DR. POLAND: Chairman Hart, this concludes the technical panelists' questions.

CHAIRMAN HART: Thank you, Dr. Poland, and thank you to the panel. We will now take a 30-minute break. We will return to this room at 5 minutes before 11, and I would ask that the witnesses come back a few minutes early to be seated to resume the questioning. The next round of questioning will be by the parties. Thank you.

(Off the record at 10:25 a.m.)

(On the record at 10:55 a.m.)

CHAIRMAN HART: Good morning, everyone. We're back in session.

Now we are going to have questioning by the parties, and the parties have been advised, but just for the benefit of the audience, let me let you know the order of events. The idea would be to have the party who's mostly represented in the questioning panel will be the last to ask questions because they're -- then that way they will hear what other questions have come up from the other parties and can respond to those accordingly. And in general, we're going to go counterclockwise around the table with the party who's mostly represented being last. So on this first panel, since mostly it's a WMATA panel, then WMATA will be the last party asking the questions, which means we'll start with FTA

and go counterclockwise around the table.

The next session, "Emergency Response Efforts," since D.C. EMS is going to be mostly represented on that panel, then they will be last, and we'll go counterclockwise. Tomorrow it'll be -- for "WMATA's Organizational Culture," WMATA will be last. And then for the fourth panel on the oversight, then the Federal Transit Authority -- Administration will be last, and then we'll go counterclockwise.

The parties will each have 5 minutes to ask the witnesses questions, and then after that time, I'll see if there's a need for a second round of questions, and we'll take it from there. So again, with WMATA being last, we're going to start the first round of questions from the Federal Transit Administration.

Mr. Littleton.

MR. LITTLETON: Mr. Chairman, thank you. No questions from the Federal Transit Administration.

CHAIRMAN HART: Thank you.

TOC?

MS. BARYSHEV: Mr. Chairman, TOC doesn't have questions at this time.

CHAIRMAN HART: Okay. Thank you.

District of Columbia?

MR. GELDART: Thank you, Chairman Hart.

My first question is for Mr. Epler. Do any of the local jurisdictions, the District of Columbia or any of the local

jurisdictions that have underground tunnels in their jurisdiction own any of the radio infrastructure that is below ground?

MR. EPLER: You're asking does any local jurisdiction own the infrastructure underground?

MR. GELDART: Yes, sir.

MR. EPLER: I'm going to tell you I don't know the answer to that, because when you say own, I'm not 100 percent sure what you mean.

MR. GELDART: Let me clarify.

MR. EPLER: Okay.

MR. GELDART: Do we maintain or operate any of the infrastructure underground?

MR. EPLER: The line of demarcation between WMATA maintenance and a local jurisdiction varies from jurisdiction to jurisdiction. But for the most part, once it goes below ground, it is WMATA's responsibility to maintain. Some equipment aboveground is actually maintained by WMATA.

MR. GELDART: For the District of Columbia, in the case here, revolving all around this incident, does the District of Columbia maintain or operate any of the below-ground infrastructure for the radio system?

MR. EPLER: Once you're below ground, WMATA maintains the equipment.

MR. GELDART: Okay. My second question is for Teddy Kavaleri. What type of monitoring -- do we do remote monitoring

of the radio system in the District of Columbia?

MR. KAVALERI: Yes. All our systems are monitored 24/7, on the 10 sites, the core sites, the core equipment, as well as the prime site equipment, monitored 24/7. We have a dispatch service. If any of the infrastructure is down, somebody responds to repair the issue.

MR. GELDART: Okay. Then for Mr. Epler, is there any similar monitoring system for the below-ground infrastructure that WMATA maintains?

MR. EPLER: Currently, WMATA's underground radio system does not have remote diagnostics and/or remote monitoring.

MR. GELDART: Okay. Thank you.

For Mr. Kavaleri again. I'm sorry to go back and forth here. Were there any failures with the radio system reported on or around the time frame of this incident to WMATA for the L'Enfant Metro area?

MR. KAVALERI: No. The only incident that was reported was on January 7th, there was a Fire and EMS response to L'Enfant Plaza. There was a radio communication issue that was reported to WMATA by email. We had a follow-up, I think, communications with WMATA stating that, potentially, they were -- the BDA was taken down for maintenance or repair.

MR. GELDART: So, without speculation, there was an issue with the radio communications in the area of the L'Enfant station just prior to the event?

MR. KAVALERI: Yes, Wednesday, January 7th, yes, a couple of days before the incident.

MR. GELDART: Thank you.

That's all my questions, Mr. Chairman.

CHAIRMAN HART: Thank you.

ATU, do you have any questions?

MR. MADARAS: Good morning, Chairman Hart. I do have a couple questions.

My first question is for Mr. Epler while we're on the topic of radios. Radio concerns are a constant topic of discussion amongst the union members. Dead spots, intermittent reception, and the new digital radios timing out are some examples of the problems that they encounter. What do you think needs to be fixed to fix the radio system? Is it an equipment issue? Is it poor technology? Is it a lack of training? Or are there maintenance concerns? Can you please comment on that?

CHAIRMAN HART: Let me just clarify that we need the answer to be factual and not speculation or opinion.

MR. EPLER: Okay. WMATA has an extremely difficult to maintain radio system. The ultimate fix will be the new 700 megahertz radio system required by the Job Creation Act of 2012. Basically, the Job Creation Act of 2012 states that if you operate on 490 megahertz, you need to vacate the 490 megahertz and transition to another frequency range. We have started that process. And when the new radio system comes in, all issues will

be resolved that we're dealing with right now.

Now, WMATA's current radio system. WMATA's current radio system was designed to provide radio coverage in the public areas of the station, and it was designed to provide what's called 95 percent/95 percent coverage. And what that actually means is 95 percent of the places in a red tile area must be provided with RF coverage at 95 percent of the time.

So the radio system, when we designed it, as I said, we put it in the red tile areas. After we put it in the red tile areas, we determined that we needed to extend the coverage beyond just the public areas and to push to some of the backroom areas, the service room areas, and other parts of the underground. We currently have a program underway to extend that coverage out to additional locations. The radio system is old. We currently have a program to update the core of the system. So we are constantly upgrading and improving radio system coverage.

CHAIRMAN HART: He just lost his mic. Is there another mike up there that works?

(Pause.)

MR. EPLER: Sorry about that. Talk too loud? Test, test. Okay. I'm sorry. I lost track. Did I answer your question?

MR. MADARAS: You did for the most part. But can you tell us when the new radio system will be completed and these problems will go away?

MR. EPLER: Good question. We hope to put it out on the street here in the very near future to get bid. The Job Creation Act says we must be done by 2021. We are doing everything possible to bring the date up toward the current time frame. At this time, I cannot tell you an exact date it'll be completed.

MR. MADARAS: Okay. Thank you.

And I have one additional question. This question is for Mr. Bunting. I'd like to call up the Exhibit C18B, please. It's a thermal imaging video.

Can you please describe what we're looking at here?

MR. BUNTING: It appears to be a thermal imaging image from our -- either from our TGV or from our revenue car that's outfitted with the thermal imaging camera. And it is differentiating the temperature of items within the tunnel structure.

MR. MADARAS: And at one point this video is going to stop at a location and obviously it caught the attention of the person who took the video. I believe it's right -- coming up here. Is this in the location of the accident?

MR. BUNTING: I have no idea where this image is from. I do not see a chainage or line or section of the railroad on the image.

MR. MADARAS: On the left side at the bottom, 70+29, I believe that's that chain marker.

MR. BUNTING: Okay.

MR. MADARAS: And the accident location was 70+50, which is just up beyond there a little bit. So the blue means that there's a lot of water in that location, or moisture. So I was just curious as to what type of corrective actions are taking place when these types of thermal imaging videos occur?

MR. BUNTING: Well, these thermal imaging videos are distributed to all the maintenance departments and our engineering staff. If there is a particular issue that shows a significant temperature change -- because mainly we're looking for heat signatures associated with the electrical system. It is not utilized for water inspection. Like I said in my previous testimony, there are track walkers that walk this section of the track twice a week, and if the water leak -- just the presence of water in a tunnel does not indicate a problem. Again, all our tunnels leak. Some of our tunnels are equipped with what's called HPRs, which are hydrostatic pressure release, that allow water to reach into the tunnel. So whether some action would be taken because of this, not unless -- not on a normal course of business. The answer is no.

We look for contemporaneous information. That's why the track walkers have been trained. People are out there every couple of days a week. And if it is creating an issue for us, a defect is noted, and then we will react to it based on priority and our ability to get into the track section.

MR. MADARAS: Okay. I just -- there was actually --

DR. POLAND: Mr. Madaras, I need to interrupt you for a moment. The 5 minutes for your questioning is over. I'm sure there will likely be time for a second round of questions, but we need to move on to the next party.

CHAIRMAN HART: Thank you, Mr. Madaras.

IAFF, any questions?

MR. HUDSON: Thank you, Mr. Chairman, not at this time.

CHAIRMAN HART: Okay.

WMATA?

(Pause.)

CHAIRMAN HART: Do we have a substitute mic for WMATA?

MR. DOUGHERTY: We have it now. Thank you. Ours shut off. Sorry.

Thank you, Chairman. Yes, we do have a couple of questions that I'd like to ask, the first one to Mr. Grooman.

Do you have plans underway to develop a fan operating guide to share information within WMATA?

MR. GROOMAN: Yes, we do. We've engaged an engineering firm to develop what we call a playbook. They'll analyze the entire system. Based on the slope of a given area, the tunnel fan layout and depending on where the incident site is, they'll develop the plans that will be shared with emergency operations, ROCC. So in case of an emergency or an incident, they go by the playbook, determine exactly what chain marker the incident has taken place, where the train is located, and then they'll be able

to develop the ventilation plan to effect providing fresh air and a safe evacuation route.

MR. DOUGHERTY: Next question is to Mr. Epler. Prior to the January 12th incident, can you explain how the radio issue was addressed that WMATA was working to troubleshoot with the fire department?

MR. EPLER: Yes, sir. Basically, on Thursday, which I believe was the 7th, we were notified by the District of Columbia that radio coverage at the L'Enfant region was substandard. At that time they contacted our system maintenance manager, and he explained to them that they're performing part of their general PMIs, where they disconnect cables and they reattach cables and they do adjustments.

And he took that information, and then he filled out a Maximo work ticket, and they actually started troubleshooting it as a D.C. issue. They started troubleshooting it, and they needed additional assistance, at which time they called engineering and asked for assistance and engineering started providing assistance.

So from Thursday up until Monday, they were troubleshooting the issue. Ultimately, where the problem was resolved is they had a -- not a reservation -- they were scheduled to go into the District of Columbia penthouse at One Judiciary Square to continue their troubleshooting effort. WMATA can't get in there without access being granted by D.C. And this is one of them areas where the demark, even though it's our responsibility,

it's still in their controlled room.

So troubleshooting was progressing up until the day of the incident. After the incident, we actually expedited it the next morning. They got entrance to this location in One Judiciary Square, and troubleshooting, they went in there and they resolved -- they pulled some what's called attenuation pads, and it seemed to resolve the issue at that time.

MR. DOUGHERTY: So you could not have made the repair without their assistance to gain access?

MR. EPLER: No --

CHAIRMAN HART: Thank you. We'll have to see what we can do about the mic issues. Now we can see if any parties have a second round. I know that Mr. Madaras has additional questions, follow-up, but does anybody else? Let's go, continuing counterclockwise again, anybody have a second round of questions? FTA? TOC? D.C. EMS? Yes, please.

MR. GELDART: Yes, sir.

For Mr. Kavaleri, do you recall when you were reached out to by WMATA to go and assist with our site at 441, where they're talking about the uplink coupler?

MR. KAVALERI: Yeah. As soon as we notified -- that WMATA was notified January 7th, that was supposed to be coordinated for them to get access. We were not aware that they needed access to where we hand off the signal at OJS radio site. We provide 24/7 support and access to any facilities. That

request was not provided to us to be able to get in from that January 7th date until right after the incident.

MR. GELDART: Okay, and one last question. The day of the incident, were there any other issues with the District of Columbia's radio system aboveground?

MR. KAVALERI: There were no issues aboveground before that date, after that date, for months and months, no issues.

CHAIRMAN HART: Thank you, Mr. Geldart.

Mr. Madaras?

MR. MADARAS: Thank you, Chairman Hart.

Mr. Bunting, just one follow-up question. On the thermal imaging videos that were part of the exhibits -- there was three of them, 16B, 17B and 18B -- on all three of those thermal imaging videos, the taker of the video stopped very close to that location. And what I was trying to ask the question was, what was the significance of him stopping and pointing it out at those locations when all three of them were almost exactly at the same point? But maybe you're not familiar with those videos?

CHAIRMAN HART: If you know. We're not asking you to speculate, but if you know.

MR. BUNTING: Right. I would not speculate on the reasoning why they stopped. I will further elaborate, though, we have -- the track department has a very similar piece of equipment that runs the system through once a month or quarterly and gets a still -- a very clear, detailed, high-definition picture of the

conditions in the tunnel structure. We don't need to rely on a thermal image to see the water leakage. So that's one of many tools that we use to look at the conditions of the tunnels, as well as we have people that walk the tunnels twice a week, and the people who are out there at all times. We have people in these tunnels all the time.

MR. MADARAS: Thank you.

CHAIRMAN HART: Thank you, Mr. Madaras.

Mr. Hudson?

(No response.)

CHAIRMAN HART: Thank you. The parties have concluded their questions for Panel No. 1. The Board of Inquiry will now begin our questions for the witnesses --

DR. POLAND: Chairman Hart?

CHAIRMAN HART: Oh, yes, I'm sorry.

DR. POLAND: I think Mr. Dougherty might have one more chance to have a second round of questions.

CHAIRMAN HART: Okay. Go for it, and I hope your mic works.

MR. DOUGHERTY: Thank you, sir.

Just one follow-on for Mr. Kavaleri. The District had recently moved to an encryption system for the fire radios. Did that have any impact with the inability to have the communications underground?

MR. KAVALERI: Yeah, encryption had no impact on the

communications during the incident. There was no coverage. If there's no coverage, encryption doesn't matter. Encryption is a capability, a software capability that rides on top of the radio. There were complete communications aboveground both for MPD and Fire and EMS, no communication issues aboveground. It was really below ground, the issues that occurred.

MR. DOUGHERTY: Thank you. That concludes our questions.

CHAIRMAN HART: Thank you. That concludes the parties' questions for Panel No. 1. The Board of Inquiry will now begin our questioning of the witnesses. Each Board Member will have 5 minutes, and we'll start with Member Sumwalt.

MEMBER SUMWALT: Thank you, Mr. Chairman.

Mr. Grooman, this set of questions is for you. I'm going to not call for it to be pulled up, but what I'm going to be referring to is Exhibit B1.2, but we don't need to call that up right now.

But Mr. Grooman, in 1983, there was a study conducted by RKE, that's Raymond Kaiser Engineers. And according to this exhibit, the study concluded that the ventilation system in WMATA, quote, "has limited capabilities in maintaining airflow past a fire incident train and cannot control the smoke and hot air from relatively small to relatively severe train fires." Based on this conclusion RKE recommended to WMATA to, quote, "develop a means of improving the ventilation system at critical locations."

Do you know what was done in response to that study?

MR. GROOMAN: No, I do not, not specific to improving the air flows.

MEMBER SUMWALT: Thank you. What I'd like to do is, I understand that we have requested that information, a follow-up from WMATA. We have not gotten it, is my understanding, so I'd like to request that you submit for the record the WMATA response to that 1983 study, if you could provide that for us, please.

Also, there was a 1985 study conducted by DeLeuw, Cather & Company, and it had a number of recommendations. What I'd like to do, if you would, kindly, is for every recommendation that either came out of the RKE 1983 study -- and I believe there were two of those in 1983 -- for every recommendation that came out of the 1983 RKE studies and the 1985 DeLeuw study, I'd like for you to please provide for the record all of the recommendations and then WMATA's response to each of those. Can you do that for us, please?

MR. GROOMAN: I will do that research, yes, sir.

MEMBER SUMWALT: Thank you very much.

DR. POLAND: Can I just interrupt? I'm sorry, Member Sumwalt.

MEMBER SUMWALT: Yes?

DR. POLAND: Is that more than one report or is that a single report that will be provided to the Safety Board?

MEMBER SUMWALT: Yeah, Dr. Poland, it's actually -- as I

understand it, there were two studies done by RKE in 1983, and then there was one in 1985 by DeLeuw. And this is as referenced to Exhibit B1.2, page 4. So whatever is referenced on that page, I'd like to know how WMATA responded to each of those, please.

DR. POLAND: Thank you.

MEMBER SUMWALT: Yes, thank you for the clarification.

I'd also like to pull up now Group C, Exhibit 5, and we'll pull that up. And there it is right there, if we could scroll through that, please, just so Mr. Grooman can see what this is.

So this was a study done by Parsons Brinckerhoff in 1987. And if we could actually scroll to the summary pages, which would be page 16 of that document -- actually page 15 -- and finding conclusion number 2 -- and yeah, page -- actually 15 of the document itself, conclusion number 2, and we can see it right here, we generally agree that the existing ventilation system is unable to control smoke without modification. Do you know, Mr. Grooman -- well, let me move to finding number 7, which then says -- which is on the next page. Finding 7 says the WMATA ventilation system lacks the capability to control smoke from even a moderate fire -- that's 20 million BTU per hour -- without equipment modifications and/or additions. Are you aware of any modifications that were made to the system in response to this study or any other studies?

MR. GROOMAN: I'm not aware of any modifications made in

reference to the study.

MEMBER SUMWALT: Thank you. If you would, if you could research that and let us know if any modifications were made in response to that.

So I'm out of time, so I'll wait for the second round. Thank you.

CHAIRMAN HART: Thank you, Member Sumwalt.

Member Weener?

MEMBER WEENER: I think I'd like to follow that on a bit. Obviously, there were some design standards that this was, the whole WMATA system was designed to, including ventilation standards. Where do those standards come from? And perhaps the question is for Mr. Grooman or Mr. Bunting?

MR. GROOMAN: The original design standards were designed by DeLeuw Cather. Once WMATA came into being, the engineering group took over the designs and control of the designs. All designs are stamped with a PE approval to meet local jurisdictional requirements.

MEMBER WEENER: So are there industry standards that are being followed here or are these all basically standards just for this project?

MR. GROOMAN: The original design, again, was based on sections of tunnel and heat loads generated either by wayside equipment and/or train traffic. Again, the original intent of the ventilation system was for temperature control in the tunnels.

Again, it was later -- or as soon as the system opened, the realization of, in agreements with the local jurisdictions, that the ventilation system would be used for emergency purposes. However, the system was not designed around heat loads that we're now familiar with the NFPA 130.

MEMBER WEENER: Given the particular structure of government standards in terms of transit rather than if this were heavy rail, would there have been different design requirements if this were heavy rail instead of transit?

MR. GROOMAN: I could not answer that question factually.

MEMBER WEENER: Does APTA or some other similar standards organization have standards that are applicable here?

MR. GROOMAN: From what I understand, the standard to follow is NFPA 130.

MEMBER WEENER: But that's for fire; is that correct?

MR. GROOMAN: That's fixed guideway ventilation systems.

MEMBER WEENER: Well, we've talked about the presence of water in the tunnel being acceptable, and presumably, the design intended to have water in the tunnel. I guess I'm just wondering where that became acceptable as a standard.

MR. BUNTING: Are you speaking about the amount of water that's allowed to flow into a tunnel? That was the question?

MEMBER WEENER: I'm trying to understand where the design standards came from, and using the water in the tunnel as

an example, where did that become acceptable? Was that acceptable through the design of the contract? Was there some underlying industry standards or practices that might have been followed in terms of the design?

CHAIRMAN HART: If you know. We're not asking you to speculate.

MR. BUNTING: Well, I can say, again, in regards to water intrusion into the tunnels, the predecessor, the Urban Mass Transit Administration had a general guideline that allowed 1 gallon per minute per 1,000 feet of tunnel as an acceptable seepage rate into transit tunnels, and that varies throughout the country whether people are more stringent or looser. So that is the best of my knowledge on that area.

MEMBER WEENER: So are the same design standards applied throughout the WMATA system given that it spans three different political districts?

MR. BUNTING: In regards to water intrusion, our tunnels were constructed, have been constructed over the last 40 years or so. And at the time of construction, those guidelines were generally followed. We used the state of the art waterproofing techniques that were available at the time. And in the 1980s, we went to the most modern type of tunneling, which is the two-pass NATM tunneling, and those tunnels are virtually dry. So it's pretty much the acceptable standard nowadays in transit and highway tunnels, is dry.

MEMBER WEENER: Okay. And with regard to ventilation, the ventilation standards are the same throughout the three political districts?

MR. GROOMAN: Over the years, there have been minor variations to -- in agreement with the local jurisdiction. Each jurisdiction has final sign-off. Most jurisdictions have all signed off. The only exception was the Forest Glen Station. That station is a deep station with no escalator entrances, and Montgomery County fire marshal wanted additional -- they wanted modifications to the current system. For example, they wanted the adjacent tunnel fans connected to the fire alarm system. They also required a track bed deluge system. Other than that, that's the only change in a specific standard that was adopted by WMATA.

MEMBER WEENER: Okay. So there are some differences then in terms of design from one station to another, from one district to another?

MR. GROOMAN: Just in that one case in Montgomery County.

MEMBER WEENER: In that one case. Thank you.

CHAIRMAN HART: Thank you, Member Weener.

Member Dinh-Zarr?

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Chairman. Like you, I take Metro almost every day, as do my family, so -- does my family, so I appreciate this opportunity to ask questions. My first questions are regarding maintenance, so for Mr. Bunting.

Are the track inspectors, are they trained to identify and report tunnel leaks, and what does this training involve?

MR. BUNTING: Well, we categorize tunnel leaks in three categories. Category 1 is any tunnel leak or any leakage that can cause a safety hazard or cause damage -- is immediately causing damage to the infrastructure. Category 2 leaks are leaks that simply are leaking into the tunnel and contributing to the overall wetness and dampness and moisture content of the area. And Category 3 leaks are just seepage leaks that really are showing no degradation to the system. The track walkers have been trained on those general guidelines, and they do rate the leaks 1, 2 or 3. That's correct.

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Bunting. And could you provide documentation of that for our docket, of this type of training?

MR. BUNTING: I would have to go to our training department and see if they have such records or if this is just a on-the-job training, part of their on-the-job training. I don't have that information.

VICE CHAIRMAN DINH-ZARR: Okay. If you could find that out for us.

DR. POLAND: So, Mr. Bunting, based on the Vice Chairman's questions, we're going to mark down that you're going to provide an exhibit on the training, and if that's not correct, you'll have to provide us information after the fact that you

don't have those records. Thank you.

VICE CHAIRMAN DINH-ZARR: Thanks, Dr. Poland. Training specific to the maintenance of the track inspectors --

DR. POLAND: Thank you.

VICE CHAIRMAN DINH-ZARR: Yes.

DR. POLAND: Thank you.

VICE CHAIRMAN DINH-ZARR: So you mentioned earlier, also, Mr. Bunting, that your system can track defects, and I think you referred a term called Maximo. Does that mean that this tracking system, it generates reports so you can identify and prioritize and act on this given the severity of the potential consequences? I guess my question is what happens with this tracking? What kind of reporting is done?

MR. BUNTING: To answer your question, the answer is yes. All our components and systems are -- have a unique identifier to them, and we have defect and component codes. And any record that is entered can be tracked for repeat failures, repeat issues, and there is a lot of discussion on these things continuously, and it helps us prioritize our work. For instance, if we have a area where we have a surfacing problem with our track repeatedly, it would cause us to focus on -- we get a report -- we can generate a report any time there is a failure that tells you if there has been a repeat failure, that tells you what date that occurred and what action was taken, what measures were in place. And we can then analyze that data and make determinations on

actions based on that information.

VICE CHAIRMAN DINH-ZARR: And so what exactly happens? I mean, what's the system when something -- when all of these defects are tracked? Is there a systematic way, though, that the reporting is done so that you can prioritize them? I mean, how -- I know you say that you do it continuously, but what does that mean specifically?

MR. BUNTING: Well, each office has an area of responsibility, and each office must develop an annual work plan based on the priorities of the Agency, based on what we want to get done, based on performance that's set by our executive leadership. And we look at all these factors when are building that work plan. And we do look at repeat failures.

In addition, we have anything that causes a disruption to service or causes us to react immediately or the fire department reacts, or anything, it ends up on an incident log. That incident log is then, every morning, discussed by senior leadership, and action plans are put in place. And in that reporting of the incident comes the entire work history for that whatever issue occurred in whatever area the incident occurred. And then we're able to -- this morning meeting includes executive leadership, the maintenance department who's responsible, and engineering responsible for that particular discipline. And we build work plans and actions based on those discussions and in developing our work plans annually and monthly, weekly.

VICE CHAIRMAN DINH-ZARR: Thank you. I'm afraid I'm out of time.

CHAIRMAN HART: Thank you, Vice Chairman Dinh-Zarr. I'm going to ask a few questions, and then we'll have a second round for the Board Members.

Did I hear a reference to a blue ribbon panel regarding water in the tunnel, a blue ribbon panel study regarding water in the tunnel?

MR. BUNTING: Yes, sir. There were three studies, significant studies done in WMATA. I believe the first one was done by UMTA in 1982. And then there was a blue ribbon panel put together by our executive leadership in the mid '90s, and then the USGS did a study in 2004, as well.

CHAIRMAN HART: Can those all be provided to be placed into the docket?

MR. BUNTING: I know of personally the UMTA study and the USGS study I'm in possession of. I would have to talk to our engineering group and see if they have the blue ribbon panel study from the 1990s.

CHAIRMAN HART: Could you do that so that we can have them brought in as exhibits?

DR. POLAND: So, Chairman Hart, that's three blue ribbon reports from -- are they from WMATA or are they from an outside organization?

MR. BUNTING: Like I said, the first one, the 1992, was

UMTA, was Urban Mass Transit Administration did a study for WMATA. The blue ribbon panel was initiated by WMATA, and the USGS -- it was the USGS did that study, and I'm not familiar with who initiated that study.

DR. POLAND: And then there were two additional studies, as well; is that correct?

MR. BUNTING: No, those were the three studies.

DR. POLAND: I'm sorry. Okay. So we'll add those to the exhibit list, then. Thank you.

CHAIRMAN HART: So thank you for that. On that subject of water leaks, you talked -- it sounded like the emphasis is on water leaks to the extent they may affect infrastructure. I'm wondering was there any program to say what about water leaks as they affect the electrical supply, especially to the third rail, since the third rail is down on the ground and the water is, too. So was there any emphasis on water leaks as it might affect power availability to the third rail?

MR. BUNTING: I'm not familiar with any of the studies that directly were focused on the electrical system. They looked at the entire infrastructure, the underground infrastructure, and the degradation caused by the water leakage into the system.

CHAIRMAN HART: Okay. Thank you.

Let me turn to ventilation. What was the purpose -- I heard reference to the NFPA 130 standard. What was the purpose of that standard, if you know, to -- you know, anybody who might know

that?

MR. GROOMAN: I think the purpose of the NFPA 130 was to standardize ventilation systems across the country and to provide standards developed by professionals for the jurisdictions to follow their expertise.

CHAIRMAN HART: And if you know, to what extent was it based on just having adequate ventilation so the people aren't breathing diesel fuel from your vehicles that are -- your repair vehicles that are going through the tunnels versus evacuation for a smoke event such as this one? Do you have any sense of -- do you have any knowledge of what the standard was intended to address?

MR. GROOMAN: It was to address safe evacuation and the control of smoke and heat in the tunnels during an event. The calculations were based on anywhere from 20 million BTU per hour to 40 million BTU per hour on calculations of how much air flow or how much velocity. It takes into consideration the grade of the tunnel, to be able to control what they call backdraft or back layering, where you've got smoke emitting -- you know, smoke rises and heat rises, and then you've got a fresh air supply that comes back under -- it's back layering underneath the smoke and heat that fuels the fire. So the intent is to develop air flow capacities that can offset that back layering effect and control where the smoke and the heat are going.

CHAIRMAN HART: Okay. Thank you. And is there a

program at WMATA to, when a ventilation fan is out of service, to report that and then take action on the report? How does that work when there are ventilation fans that are out of service?

MR. GROOMAN: What we developed several years ago to elevate what we call fire life safety components -- tunnel fans are one of them; fire lines are another. Whenever any fire life safety equipment is reported as having a problem, it gets an FLS designation. What that does is that immediately prioritizes the work. We have automatic email notifications each week that go out to managers that highlight the items that are out of service or need repair. If 30 days goes by, it gets elevated. Anything older than 30 days, it's highlighted in red, so that gives upper management, anyway, visual -- a visual status of what's going on up there, and then to take appropriate actions, as necessary, to get the FLS work order closed.

CHAIRMAN HART: And just one last question on this round, and that is who would know that a ventilation fan is not working and how would they know? What would be their source of information to know that a ventilation fan is not working?

MR. GROOMAN: All right. Two processes. We do the monthly preventative maintenance. If anything is found during the preventative maintenance, the work order would be opened. Additionally, because ROCC has control of the fans to clear work areas, if a fan becomes operational, there is an alarm that is generated to the ROCC, who then would open up the work order and

assign the FLS designation to it.

CHAIRMAN HART: You said if it becomes operational. You mean if it fails to operate? You said if a fan becomes operational.

MR. GROOMAN: I'm sorry. Inoperable.

CHAIRMAN HART: Okay.

MR. GROOMAN: If any individual fan does not spin.

CHAIRMAN HART: Okay.

MR. GROOMAN: We have flow sensors that detect movement of air, so then we know whether or not we've lost power, whether or not a fan is not spinning; we know there is a problem and it shows up on the alarm list within ROCC.

CHAIRMAN HART: Okay. Thank you.

Now we'll commence with the second round. Member Sumwalt?

MEMBER SUMWALT: Thank you.

Mr. Grooman, I'd like to follow up to Chairman Hart's question about NFPA 130. When did that come into being? Was that somewhere around the early to mid '90s?

MR. GROOMAN: NFPA 130 came into existence in 1983, and I believe it's updated every 3 to 4 years.

MEMBER SUMWALT: I see. Thank you.

I was reading in Exhibit 1.2, and there's no need to pull that up, but there was some reference made to what -- did WMATA make a significant change to its ventilation system sometime

after the mid '90s?

MR. GROOMAN: With the opening of the segment from Wheaton to -- I'm sorry -- from Wheaton to Glenmont, the last segment on the B line, on the Red Line, they did go back and retrofit the existing tunnel fans to come up to NFPA standards. The outer F line, which uses jet fans met the NFPA standards, as well as the N line, the new Silver Line.

MEMBER SUMWALT: Thank you. And I think you referenced that earlier, so -- and I think they replaced two fans with jet fans, or something like that, I believe. But to upgrade that throughout the entire system, I believe you or Mr. Bunting said that might have been $550 million, or something like that; is that --

MR. GROOMAN: To upgrade the existing fans to a higher capacity, the cost estimate going back to 1991, the estimate back then was over $500 million.

MEMBER SUMWALT: Okay. Thank you.

I'm not sure which representative from WMATA could best answer this, but what SOPs and training does the OCC have for smoke in the tunnel?

MR. GROOMAN: They have developed a procedure on how to operate the fans depending on where the incident is, where the train is, and where the fans are located.

MEMBER SUMWALT: And that's post-January the 12th; is that correct?

MR. GROOMAN: Post-January 12th, yes.

MEMBER SUMWALT: And prior to this event, this accident that we're referring to?

MR. GROOMAN: Prior to this event, the only training they had was basically an owner's manual, how to operate the AIM system to either turn a fan on, turn a fan off, put it into supply or put it into exhaust or turn it off or on or place it in automatic mode.

MEMBER SUMWALT: Thank you. Again, no need to pull this up, but Exhibit 1.1 of Group B, it says that a -- it states that a biannual inspection of the L route, which is the L route between the L'Enfant Plaza and the L'Enfant portal, which was performed in October of 2014, found that the condition of the drains and troughs of having a rating of 4, which is considered to be poor condition. So what's the significance of having the drains and troughs be poor condition? And to be clear, the L route tunnel, that is the route between L'Enfant Plaza platform headed towards the Pentagon; is that correct?

MR. BUNTING: That is correct.

MEMBER SUMWALT: Okay. Good. I just wanted to clarify that. And so what's the significance of the drains and portals -- I'm sorry -- drains and troughs having a rating of 4?

MR. BUNTING: Well, if you have a rating of 4, which is a poor condition, if my memory serves me correctly, that would mean that there's an obstruction of some type that the water is

not draining to the area which it's intended. And my understanding after review of that report is that the drainage trough was -- had debris in it, had a significant amount of newspapers and other debris that was causing water to flow all over the track bed, as opposed to down the drainage trough and into the main drain.

MEMBER SUMWALT: Okay. Thanks. And so to be clear, is it your testimony that after this particular drainage system was found to be of a rating of 4, which is, in fact, poor, that that was the problem and that it was corrected?

MR. BUNTING: I have no knowledge myself that it was corrected. However, I've been in the tunnel since then, and the area is clear of -- the drainage troughs and drains are flowing freely, so my assumption is, yes, it was cleaned at some point.

MEMBER SUMWALT: Could you please, Mr. Bunting, for the record, supply any records that you may have, that WMATA may have in reference to this particular finding of the October 2014, where this -- where these drains and troughs were found to have a rating of 4 in this particular area of the accident? If you could do that, any records or any records that WMATA may have? So I'm out of time, but thank you very much.

Dr. Poland, do you know exactly what it is we're referring to?

DR. POLAND: So, Mr. Bunting, you're going to provide a WMATA record of the drains and troughs in the tunnel L-1, is that

correct, from October 2014?

MR. BUNTING: I will look for a record of maintenance activities in the area to see if it was documented. Let me explain that many times this work will be done undocumented if it's simply an obstruction, a newspaper, a bottle, or something. A track walker in the performance of their duties will clean that up, and that will not show up on any maintenance record. So when it's the troughs that are clogged, that's very possible that's how that situation was rectified. But I will do a search and let the Board know.

DR. POLAND: Thank you. Please let us know positive or negative, if you find a report and if you are not able to find a report.

MEMBER SUMWALT: Thank you. And to make sure that we're talking about the same thing, what I am referring to is Group 4 -- I'm sorry -- Group B, Exhibit 1.1., on page 5, and that's where the discussion about this biannual inspection is. So thank you very much.

CHAIRMAN HART: Thank you, Member Sumwalt.

Member Weener?

MEMBER WEENER: Yes. We had a lot of discussion about how to get smoke out of the tunnel. I'd like to talk a little bit about how smoke comes into the tunnel in the first place. How many smoke events does WMATA have in a typical year?

MR. GROOMAN: I don't have that number in front of me.

I think the last number I saw, so far for this year was 200 some, which is an increase over previous years. I do know that. I believe it's attributed to an increase in awareness of reporting incidents of sparking insulators, smoke, any fire. Any fire alarms that are activated are recorded as well. So there is an uptick, but again, I believe it's directly related to a higher awareness or a higher, increase in awareness of reporting.

MEMBER WEENER: Okay. So we're talking about a couple of hundred events in 5 months, 6 months?

MR. GROOMAN: Yes, sir.

MEMBER WEENER: Is arc tracking the major cause for these events?

MR. GROOMAN: I'm sorry. The question again?

MEMBER WEENER: Is arc tracking -- the NTSB has recently put out a recommendation for sealing of the connectors because of the potential for arc tracking.

MR. GROOMAN: Oh, I don't think that's the leading cause at all, no, sir.

MEMBER WEENER: You what?

MR. GROOMAN: I don't think that's the leading cause of the smoke incidents, smoke and fire incidents. Arcing insulators are probably the leading cause of smoke or reports of smoking or arcing in the tunnel. It isn't necessarily cables, but --

MEMBER WEENER: Okay. But it is -- you did say arcing on the insulators, so it would be arc tracking?

MR. GROOMAN: I'm not familiar with that term, arc tracking.

MEMBER WEENER: You're not familiar with the term? Okay. Well, arc tracking is a continual leakage of current across a surface because of developing electrical path. I guess it was my understanding that since we sent the recommendation on sealing the connectors, that arc tracking would have been high on somebody's list.

MR. GROOMAN: Mr. Miller will have more -- is more involved in that.

MR. MILLER: Sir, back on the original number of incidents, which Mr. Grooman is going to provide for you, the last 6 months of this current year, we have had four cable issues, if that clarifies any of your questions regarding cable.

MEMBER WEENER: I guess I'm trying to understand where the majority of these smoke events come from. What is burned? What produces the smoke? We've been talking about arc tracking, which we put out a recommendation on, and you say that's a fairly rare event, 4 in this past year out of 200 events?

MR. MILLER: We had four -- there's four cable incidents for the calendar year 2015.

MEMBER WEENER: Four cable events. So a cable event would be, then, typified by the event of the 12th of January?

MR. MILLER: Yes, sir. The L'Enfant issue would be -- was actually the first one this year, and immediately after that,

in February, we had a cable event at Courthouse. And then in April, we had one at Rosslyn. And then in early June, we had one at Friendship Heights. And they were directly -- the cables were involved. And please understand, when you have a smoke event it could be any number of issues. It could be debris. It could be leaves, cable, as we talked about. It could be arcing insulators, which is, I think, is what you're referring to when you regard -- when you're making comments as tracking, I think you're referring to arcing insulators.

MEMBER WEENER: I think the predecessing, or preceding event for arc tracking would be just a leakage path across the insulator or a leakage path to ground from the --

MR. GROOMAN: Of all the incidents that have been recorded, we track cause, so we can provide that. That'll show whether it's a debris fire. When a shoe comes off the third rail, it can spark, can cause a cross-tie fire. So we do have a list of all the reported incidents. Again, Mr. Miller said that cable incidents were only four this year, but there's other reasons for smoke and small fires.

MEMBER WEENER: Okay. Could you provide that?

MR. GROOMAN: Yes.

MEMBER WEENER: Thank you.

CHAIRMAN HART: Thank you, Member Weener.

Member Dinh-Zarr, Vice Chairman Dinh-Zarr?

VICE CHAIRMAN DINH-ZARR: Thank you, Chairman Hart.

This is a question for Mr. Grooman. So because there are these different capabilities and limitations at different sites -- and I understand that, in answer to a previous question, you'd asked -- you'd said that there is playbook being developed by consultants regarding ventilation; is that correct?

MR. GROOMAN: That is correct.

VICE CHAIRMAN DINH-ZARR: So at the time of the incident and before that and now, is there any guidance, any type of map or playbook that is currently being given at different locations so that people know how to act -- I mean, your staff would know how to act within WMATA regarding, you know, either for the train operators, dispatchers, others, when there is a smoke event? Is there any type of guidance related to that?

MR. GROOMAN: Currently, it is the ROCC controllers have received a diagram of certain scenarios, location of the station, location of the fans, and location of an incident, and location of where a train may be. That has been provided to the ROCC controllers as a precursor to our formal playbook, if you will.

VICE CHAIRMAN DINH-ZARR: And that's since the incident has happened --

MR. GROOMAN: Yes, ma'am.

VICE CHAIRMAN DINH-ZARR: -- you've done that; is that right?

MR. GROOMAN: Yes, ma'am.

VICE CHAIRMAN DINH-ZARR: And does that also tell the

ROCC operator or dispatchers about which direction the fans, the operation of the fans? Because I understand that some fans only operate in one direction; is that correct?

MR. GROOMAN: That is incorrect. All of our fans are reversible. They can supply or exhaust. Their playbook does indicate which direction to place the fans depending on where the incident is.

VICE CHAIRMAN DINH-ZARR: Okay. So when you were mentioning before, though, some fans operate in only one direction, that's not a limitation of the equipment, then; is that correct? That's just that they're operated in one way in order to be effective at that location?

MR. GROOMAN: I'm sorry. Repeat that?

VICE CHAIRMAN DINH-ZARR: Because I believe in a previous answer, you mentioned that there are some fans that are only operated in one direction, but that's not a limitation of the equipment? It's just done that way because of a certain location? Am I understanding that --

MR. GROOMAN: There's no limitation on the operation of the fans. They can be controlled in either direction.

VICE CHAIRMAN DINH-ZARR: Okay. Thank you.

MR. GROOMAN: The next panel would have more information on the ROCC operations.

VICE CHAIRMAN DINH-ZARR: Okay. And related to that, because of all these differences, do you pass on this information

-- do you give that to someone related to emergency response or does somebody from emergency response contact you to have this type of operations equipment information?

MR. GROOMAN: We did coordinate with the ROCC post the incident on ensuring the operation of the fans was specific to where an incident was happening, and again, the layout of the -- where the incident site is, and again, where the train is, where the path of evacuation would be.

VICE CHAIRMAN DINH-ZARR: So that's information that you passed to them?

MR. GROOMAN: To our -- in coordination with ROCC, yes.

VICE CHAIRMAN DINH-ZARR: Okay. Thank you.

Just moving on, in remembrance of the time, Mr. Miller, I'd like to ask you a question about the cables. So you mentioned that you follow up on smoke reports, and you do a full investigation when it involves a cable; is that correct?

MR. MILLER: Yes, ma'am.

VICE CHAIRMAN DINH-ZARR: Thank you. So based on that, have you -- are there fewer arc -- are there fewer incidents of this -- of any type, I suppose, where the cables have been replaced than in the old cables?

MR. MILLER: Yes. Let me go back in history with the -- you know, as I indicated earlier, the -- excuse me -- as I indicated earlier, we have progressed with the technology of the low smoke cables. When we go into replacing cables, it's very

important to know with the environment that they're under. We have cables that are in the original insulation from construction that are in the perfect environment, with humidity, water, heat, sunlight, that they actually look and test as if they were pristine, in perfect condition. On the other hand, we have cables in our system -- back into our cable replacement program, we have replaced areas five times within the last 10 years at the exact same location. The original -- as an example, a couple weeks ago, we replaced cables that were 16 months old. So, again, site-specific locations are what drive this cable replacement.

VICE CHAIRMAN DINH-ZARR: Given the same conditions, though, you'd say the new cables have fewer arcing incidents; is that correct?

MR. MILLER: In a general sense, yes, but I don't have that data to support that.

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Miller.

MR. MILLER: Yes, ma'am.

CHAIRMAN HART: Thank you, Vice Chairman Dinh-Zarr.

DR. POLAND: Chairman Hart, can I interrupt for a minute?

CHAIRMAN HART: Yes, please.

DR. POLAND: Dr. Dinh-Zarr brought up a line of questioning, and I'm not sure that we have the exhibit that Mr. Grooman was referring to.

You spoke about a diagram that was used by the Rail

Operation Control Center operators that would give them some sort of a scenario so that if the train was in a certain position, they would know which ventilation fans to turn on. I don't believe that's currently an exhibit. Can you provide that to us as an exhibit, please?

MR. GROOMAN: Yes.

CHAIRMAN HART: Thank you, Dr. Poland.

I have a question about how this -- you talked about the change in the process for knowing the big picture about where the fans are and where the sources are and where the trains are, and I'm just trying to picture it in my mind. There's a dispatcher sitting in front of a board, which we toured a couple weeks ago, and is there any one person -- would it be that dispatcher, or is there any one person who would know where the train is, where the smoke is, where the fans are, to have the big picture to say, well, I want to put this one in supply and this one in exhaust in order to keep the smoke away from the train? Is there any single point of information or am I asking the wrong group? Should I just go to the emergency response folks?

MR. GROOMAN: I'd refer you to the next panel, sir.

CHAIRMAN HART: Okay, because I wasn't -- did not see how that information would come to one person to make the decision. Because, to me, it's intuitively obvious you get a report, smoke in the L'Enfant Station, and then the immediate response is going to be exhaust -- put those fans in exhaust to

get the smoke out of the station. Little did they know that by doing that, now they've drawn the smoke from the source, through the train, into the station, whereas if smoke had gone the other way, away from the train -- but that would not be something that a person would know unless they had the big picture. And that's what I'm trying to find out is how -- would some individual know the big picture to say this fan needs to be in exhaust, this fan needs to be in supply, keep the smoke away from -- et cetera. So that would be a question that would be more appropriate for the emergency response people?

MR. GROOMAN: Yes, sir.

CHAIRMAN HART: Okay. Thank you.

Any more questions from the Board before we return it to the tech panel? Any further questions?

(No response.)

CHAIRMAN HART: Okay. I'd like to return the questioning, then, to the tech panel, and we'll go until you're finished, or 12:30, whichever first occurs.

DR. POLAND: Thank you, Chairman Hart. I'm going to turn the questioning over to Mr. Joe Panagiotou.

MR. PANAGIOTOU: Thank you, Dr. Poland.

I want to follow up on this last few questions that were asked. So there are predetermined configurations for the ventilation system operation. Basically, they're location specific. So certain fans would be turned on in supply, certain

would be turned on in exhaust, depending on the origin of the smoke. So my question is: Does WMATA have a smoke detection system throughout the station and tunnel network with which to identify the source of the smoke?

MR. GROOMAN: We have no smoke detection in the tunnels. There is smoke and heat detection in service rooms in the stations.

MR. PANAGIOTOU: Thank you. One of the early action items WMATA was going to undertake after the incident was to do a study or generate a report on the feasibility and cost of adding a smoke detection system throughout the network. Has that taken place? And if so, what decisions were made?

MR. EPLER: Yeah. That's my department. We did an exhaustive survey of what other agencies actually do, and we did an exhaustive survey on what technologies are available. And we did generate a report, and we forwarded it up the chain of command.

MR. PANAGIOTOU: Do we know if any action will be taken?

MR. EPLER: Right now, that's above my paygrade, to be perfectly honest.

MR. PANAGIOTOU: Okay. Thank you very much.

I will now pass the microphone over to Dr. Liu for some follow-up questions he has. Thank you.

DR. LIU: Thank you. Before I ask questions, I want to clarify on the Exhibits C16 through C18, the thermal imaging

videos that came up during Mr. Madaras' questioning. To my knowledge, those videos were provided to NTSB by WMATA as a special effort to support NTSB's investigation. And those videos were part of a longer run through the tunnel system and the reason, again, to my knowledge, the reason that video stopped at the accident location because that's where the investigation, we're focusing on. And I believe the annotations, even the annotations were later added by WMATA.

Okay. So I have a few follow-up questions to Mr. Bunting. You mentioned that some of the tunnel segments were designed and built 4 years ago and Member Weener asked about the design standards they conform to. Some of the reports I read describe a tunnel rehabilitation program that was performed sometime, if I remember correctly, sometime in the '90s. If you are -- my question is: Are you familiar with the program? And if so, could you describe to me the program or similar program that's currently in place in WMATA?

MR. BUNTING: My knowledge on that is limited. I was in maintenance at the time. Those types of projects were undertaken by our infrastructure renewal group. We supported the project, so I have some familiarity of what occurred at the incident tunnel, you know, the bolts replaced, water leaks were stopped, the panels were painted. And under our current capital program, there are tunnel rehabilitations underway as well, in a variety of different areas for a lot of different things, not only water leaks, but for

lighting and other things as well. The stations -- our capital program covers a big portion of our infrastructure.

DR. LIU: Thank you. If I understand you correctly, so there's currently a bigger program that is going on whose purpose is to bring the infrastructure of the Metrorail to a better state of good repair; is that correct?

MR. BUNTING: That is correct, sir.

DR. LIU: Thank you for that.

I want to circle back to the subject of tunnel inspections. I know you have touched on that, but I want to go a little deeper, if I may. Prior to 2013, WMATA had two types of tunnel inspections going parallel: a general structure inspection and the special leak inspection whose sole purpose was to identify leaks. However, the leak inspections stopped in 2013 and now there's only the tunnel structure inspections. Could you explain to me what was the reason behind this change?

MR. BUNTING: Yes. Again, we are a maturing agency. And as we mature in our technologies and our tools improve, we drop off some things that we used to do and we now use different tools. As I reacted to Mr. Madaras' question, we have a visual way for our maintenance people to look at the conditions of the tunnel through our TGV that photographs the entire tunnel -- the entire infrastructure, tunneling infrastructure, with high definition cameras. We have our track walkers who are out there every -- twice a week, who notate the different leaks and other

conditions and defects out there. We have tools with which we can now analyze these things.

The tunnel leak inspection was a snapshot for at the time period of which it was done. A tunnel leak inspection in February provided very little valuable data in August. The conditions change continuously out there, like I had spoke earlier. So the methodology in which we now monitor our infrastructure is much more continuous and much more contemporaneous.

So I can get into the database today and query all the D-48 defects in any section of the railroad and see how many leaks are in that area that have been reported that are affecting the infrastructure. Or I can go to the TGV, which is the track geometry vehicle analytical group and get their latest video run and get a clear, high definition run of the section of which I have interest in. And there are procedures in place that require the managers who are responsible for these areas to actually go into the field and to know the condition of the infrastructure which they're responsible for. One of our OAPs says that the maintenance manager responsible for that area must inspect that area on foot four times a year.

So, again, just because we stopped that one effort, which was a snapshot which quantified the leaks in the area, we still, we feel that -- or I feel that we have a better inspection program today than we did back when we used to take that 1 day,

2-week snapshot of -- it took about a month to walk the entire section and notate all those leaks. But again, what I collected in February did not provide me value in August.

DR. LIU: Thank you for the information. But please keep your answers to factual information as opposed to personal opinion or analysis. I appreciate that.

The main reason for my question is that the latest tunnel structural inspection identified no leaks near the arcing location, as evidenced by Exhibit C14. Could you please -- can we bring up Exhibit C14, please?

On the other hand, the leak inspection identified many leaking conditions near the arcing location, as shown by Exhibit C13. Since there are no longer leak inspections, my question was, is there any other sources apart from the structural inspections to identify leaking conditions? And based on the information you just provided, it appears to me that you believe that the new procedures that are currently in place can effectively replace the leak inspections that were conducted before 2013. Could you confirm that or comment on that, please?

MR. BUNTING: Well, what I can say is that the date of the incident, there were leak-related defects within the database. There were two priority 3 defects of water condition and leaking in the area and water condition defects between chain marker 66+00 and 71+00. So the data was there. It had been collected through our current program, and the data was there. So what I'll say is

that the data is available to be used when we prioritize our work.

DR. LIU: Thank you. I don't believe I have that data. Could you provide that source of data to me after the hearing, please?

MR. BUNTING: Um-hum.

DR. POLAND: Xiaohu, can you clarify what that report is that you're asking for, please?

DR. LIU: Yes. I was asking about the status of the water intrusion status at the arcing location close to the time of the accident. The reason for my asking that is the structural inspection that was conducted in October 2014 didn't identify any leaking conditions at that location. However, Mr. Bunting just said that there are other sources of data that show there was a defect, a water leaking condition at that location sometime close to the accident. So that's what I was asking him to provide me after the hearing.

DR. POLAND: So just to clarify -- I'm getting some information from our investigation-in-charge. Is that report D-48 that would talk about the leaks reported over the last 5 years, as well as at the L'Enfant Plaza location?

DR. LIU: I'm not aware of that.

MR. GORDON: Okay. Mr. Bunting, you referred to you could run a query of your database for -- I'm assuming that D-48 is the defect code that corresponds with a leak in the tunnel?

MR. BUNTING: Yeah, D-48 and D-42. D-48 is water

leaking. D-42 is water condition.

MR. GORDON: Okay. If you could provide us that information -- how far back does that go? Is that a report that's been generated for the past 5 years?

MR. BUNTING: Our use of the Maximo defect database probably goes back 5 years, or so. Prior to that, we did not have Maximo available to us. I would be glad to do that.

MR. GORDON: Okay. Yeah, if you could provide us with that information with those two defect codes going back to the beginning of the Maximo system, and we'll just carry it through today's date. Thank you.

DR. LIU: Just to make sure I understand this, so these type of defects, apparently, they were not identified by the structural inspections. So, I mean, if they exist in the system, they must have been identified during procedures such as track inspections or other type of procedures you described; is that correct?

MR. BUNTING: I would have to look in the database to see exactly who entered them to tell you what group they came out of, but that would be my assumption.

DR. LIU: Thank you. So your system not only is able to provide not only the existence of defects, but also provide the source of the defects -- the source of how the defects were identified?

MR. BUNTING: That's correct. Every person has a unique

sign-on into the system, and when they record or modify data, that data -- there's a log, and it requires your employee number, the date, and all of that is auditable and trackable, yes; correct.

DR. LIU: Thank you. That completes my questions. Thank you.

I'll turn it over to Mr. Payan.

MR. PAYAN: Thank you.

Mr. Miller, I'm going to go back a little bit on the current program that WMATA uses to monitor the third rail cable integrity. You mentioned that in the late 1990s WMATA had a periodic meggering program, and that has migrated now to a meggering as required, along with thermal imagery and track walkers; is that correct?

MR. MILLER: WMATA had a full-time meggering program in the late 1990s. We had a dedicated crew to that.

MR. PAYAN: Okay.

MR. MILLER: The -- excuse me. I'd like to continue for a second?

MR. PAYAN: Sure.

MR. MILLER: The results of that meggering program told us very clearly where we had to take immediate action to start our cable replacement program. When you go to the current values of how we're meggering today, it actually goes to three individual aspects. We will revisit areas that are known to have a shorter cable life. We will also go into known problem areas and megger

additional cables in the entire area. And we will also, as we install new cables, we will megger each and every cable that we install to assure its integrity.

MR. PAYAN: But system-wide, there's no periodic meggering program in place right now?

MR. MILLER: No, sir.

MR. PAYAN: Okay. And how effective is the thermal imaging to identify a degrading third-rail cable?

MR. MILLER: The thermal imaging is a -- it's a wonderful product. What happens is we will get this report every 3 months. That report is recorded. It went through the entire system, and then, immediately, that report is given to our engineering folks. Once our engineering folks look at it -- they will analyze it -- they will sit down with us and we'll discuss what issues we see, or anomalies, and then we will, either our group or the operations group will take immediate actions to what the recommended investigation should. And it has paid us dividends, many dividends.

MR. PAYAN: Okay. So educate me a little bit. I'm familiar with the meggering, and I have tests from different times, 10-year periods or 4-year periods, and you can see a cable degrading by the insulation resistance slowly showing a degrading cable.

MR. MILLER: Yes, sir.

MR. PAYAN: Can you do that same analysis with the

thermal imagery? Can you see a cable slowly degrading over time?

MR. MILLER: No, but what you do see is anomalies. And by doing that -- I'll give you an example. If you have an entire set of negative return cables that are coming off of within a high current bond, in our system, you will see anywhere between 6 and 12 of those cables lined up right in a row. So we're looking at -- the thermal imagery will give you an ambient air temperature of each individual connection if they're different. So in other words, if all the connections are cool -- let's just say there are six of them out there. If all the connections are cool, you're going to see an ambient air temperature of probably whatever is in the tunnel. However, what we find is we will see one connection in the middle of that entire row that might have an ambient or elevated temperature. What that tells us is that there's something that needs to be investigated with that cable. It could be anything from a little bit of water on the cable. It could be a loose connection. It prompts our investigation to go find what that is because it's different.

MR. PAYAN: Okay. And the thermal imagery is effective in capturing cables that are laying outside of the third rail, away from where the running rail -- running at track speed?

MR. MILLER: Yes. What happens, if you look at the imaging reports, you will see the third rail cable stub-ups along with the actual cables that may be installed up or down the track, and if there is an anomaly, you will see it in that thermal

imagery report. And typically, it's by an elevated ambient air temperature.

MR. PAYAN: Okay. Thank you.

Switching channels a little bit, in discussions with WMATA personnel, we were told that WMATA used to have a cleaning program for their insulators. And we were told also that they were -- WMATA was revisiting that issue as to possibly re-implementing the insulator washing program. Can you tell us the status of that, if it is in fact going to be implemented?

MR. MILLER: I would like to defer that question to my colleague, Mr. Bunting.

MR. PAYAN: Okay. Very good.

MR. BUNTING: Well, I will tell you that I don't know where the information comes from that we are not cleaning insulators. We have cleaned over 40,000 -- we have cleaned over 30,000 insulators in the last 5 years, and we have replaced 40,000 insulators in the last -- over the last 5 years. So we are aggressively upgrading that system and cleaning that system, and trying to prevent any arcing conditions that cause these service disruptions that we observe.

MR. PAYAN: So is this a periodic program that's in place right now?

MR. BUNTING: This program is ongoing and has been ongoing.

MR. PAYAN: Okay. Now, does that cleaning program

include cleaning third rail cables?

MR. BUNTING: No, sir, it does not include cleaning third rail cables. It focuses on the insulators between the track bed and the bottom of the third rail.

MR. PAYAN: Okay. Thank you. That's all the questions I have.

DR. POLAND: I would like to clarify one of the reports that was discussed between Mr. Epler and Mr. Panagiotou. I believe it was called the smoke detection feasibility report, and I wanted to clarify. I believe that is a report that we have already been provided at the NTSB. Is that correct?

MR. PANAGIOTOU: Yes, it is.

DR. POLAND: Okay. I would like to enter that into the docket as an exhibit as well. And then I believe Mr. Panagiotou had a follow-up question?

MR. PANAGIOTOU: Yeah, one last question for Mr. Epler. You said that the decision that would be based on this report just mentioned was not yours to make. Whose is it? Who will make that decision on whether or not to go ahead with installing smoke detectors in the tunnels and when could we expect that decision to be made?

MR. EPLER: This is really not a question to be answered by me. It'll be answered in one of the later panels. But basically the way the system works is, this will come before the Capital Improvement Program, and the Capital Improvement Program

on a yearly basis makes recommendations and makes decisions. Once again, there will be a panel later that will -- Mr. Troup can answer that question later.

MR. PANAGIOTOU: Okay. Thank you very much. Thanks to all of you.

MEMBER SUMWALT: There's a mic on over here, and I think only three mics can be on at the same time, so if you could unkey that mic?

MR. EPLER: I'm trying to turn it off.

DR. POLAND: Chairman Hart, this concludes the tech panelists' questions. Thank you.

CHAIRMAN HART: Thank you very much. Before we close with this panel, Dr. Poland, can you please review the exhibit items that have been requested in this panel?

DR. POLAND: Yes. I'm going to ask Mr. Benjamin Allen to review the list that he's been keeping.

Mr. Allen?

MR. ALLEN: Does this work? Hey, it works. Okay. All of these, I believe, are to WMATA. And if any of the people who have requested these, if I've got it slightly wrong, please let me know.

The first request was for the Maximo work order of July 14th for the tunnel water repair.

The next was information on how much of the network was examined in the studies on ventilation.

Member Sumwalt asked for the WMATA response to the 1983 ventilation study, the responses to all the recommendations in the RKE studies from 1983, and the DeLeuw studies from 1985, as well as responses to the 1987 studies that were discussed in Exhibit C5.

The Vice Chairman has also asked for documentation of the track walker training or the track inspector training, be it OJT or if there is a formal training program; so either documentation or information if it's not a formalized training program.

We've also asked for what I believe was the 1993 UMTA and USGS studies, as well as the blue ribbon reports.

We asked for the records of drains and troughs with a rating of 4 in the area of the accident. This is what we had discussed in Exhibit B1.1, page 5.

We asked for the number of smoke incidents to date in 1995, as well as the sources of those incidents.

The ROCC diagram on the various scenarios for vent fan operation.

All reports of D-48 and D-42 for the entire duration of the Maximo data, but that was just going to be for the L tunnel, the one that was involved in the incident here.

And finally, the smoke detection feasibility study, which we've entered -- Dr. Poland asked to be entered will be Exhibit H18, H18.

Thank you.

CHAIRMAN HART: Thank you. That concludes the first panel of this hearing. I want to thank the tech panel for excellent questions. I want to thank the parties for participating in it and engaging in the process so well. And last but not least, thank the panelists for providing very -- the very informative presentations and answers. Appreciate that.

We will now break for lunch. We're a few minutes early. We were planning to come back at 2:00, but since we're a few minutes early, and I don't know how long the next panel is going to take, I'm going to take advantage of this 10 minutes extra and say let's return at 1:50 for lunch. But please return in time to pass through the security system, and I also ask that the witnesses for the next panel return early to ensure that they are seated at 1:50. So we are adjourned until 1:50 for lunch.

Thank you.

(Whereupon, at 12:20 p.m., a lunch recess was taken.)

A F T E R N O O N S E S S I O N

(1:50 p.m.)

CHAIRMAN HART: Good afternoon, everyone. We are back in session. Welcome back to the first afternoon of the first day of the investigative hearing on the WMATA accident on January the 12th.

Dr. Poland, can you please introduce the second panel?

DR. POLAND: Chairman Hart, the second panel will address emergency response efforts. The panel will discuss response activities, communication, coordination, protocols, training, and experience levels, including the experiences of a nearby jurisdiction.

Witness Panel 2 is composed of the following individuals, from left nearest the Board Members: Chief Derron Hawkins, District of Columbia Fire and Emergency Medical Services; Mr. Stephen Williams, District of Columbia Office of Unified Communications, or D.C. 911; Chief Scott Goldstein, Montgomery County Fire and Rescue Services; Mr. Ronald Bodmer, WMATA; Mr. Hercules Ballard, WMATA.

The NTSB technical panel is composed of, starting on my left: Mr. Steve Blackistone, the panel chair; Dr. Joseph Gregor; Mr. David Bucher; and Mr. Rick Downs.

I now ask that the witnesses please stand to be sworn. Raise your right hand. Please answer by saying I do.

(Witnesses sworn.)

DR. POLAND: Please be seated.

Chairman Hart, these witnesses have been prequalified in their respective experiences, and qualifications appear in the docket as exhibits in Group B.

As a reminder to the witnesses, please push the microphone button to talk, and then push it again when finished. Also, please answer the questions factually and avoid analysis.

I now turn the questioning over to Mr. Steve Blackistone.

MR. BLACKISTONE: Thank you, Dr. Poland.

Would you bring up the animation, please? We'd like to begin this session by providing an overview of the emergency response to the incident.

First, Mr. Bodmer, could you please give us a brief 3-minute description of WMATA's emergency response activities on January 12th?

MR. BODMER: Yes, sir.

Good morning, Chairman Hart, Board Members. Thank you for this opportunity to provide an overview of Metro's emergency response activities on January 12th.

At approximately 3:15 on January 12th, Yellow Line Train 302 stopped after encountering smoke while traveling southbound toward the Potomac River Bridge from L'Enfant Plaza. The train operator immediately contacted Metro's Rail Operations Control Center, which we refer to as the ROCC. This notification followed

protocol and initiated a coordinated response.

That afternoon in the ROCC, four active incidents involving fire or electrical arcing were reported within minutes of each other. Managing these incidents, as well as the 100 trains in service across the system, it was particularly fast-paced in the control center that afternoon.

The ROCC personnel engaged in the L'Enfant Plaza incident included a director, a superintendent, one assistant superintendent, all of whom are experienced Metro veterans. The two train controllers assigned to the other Green Line consoles include one experienced senior controller, one controller who was newer to Metro but was formerly a military air traffic controller.

ROCC controllers are trained in all aspects of Metrorail procedures, including incident response. They receive 26 weeks of additional training, as well as continuous refresher training provided through lessons learned reports, tabletop exercises, and incident review briefings following major service disruptions.

As the L'Enfant Plaza incident developed, the ROCC notified the District of Columbia Office of Unified Communications at 3:22, advising of heavy smoke at the station. This was followed less than 2 minutes later by a call for the Metro Transit Police requesting fire and medical response to L'Enfant Plaza. In this call, MTPD stated that there was smoke in the station and people could barely breathe.

An incident management conference call was also

initiated, as is standard procedure at Metro. That call includes senior officials for rail operations, transit police, emergency management, safety, car maintenance, track, power, bus operations, customer service, and communications, all on the line to ensure a timely and coordinated response, appropriate resource deployment and support from all necessary WMATA departments, as well as to provide accurate and timely information to our customers.

The Metro Transit Police Department dispatched all available resources to assist, as well as an official to the Rail Operations Control Center to serve as a liaison between the Metro Transit Police and Rail Operations. Once the fire department arrived at L'Enfant Plaza, the highest ranking Metro Police official at the scene attempted to participate in unified command.

The unified command structure allows Metro and other responding agencies to gain information from each other and coordinate their activities. This procedure, along with all procedures and policies governing emergency response activities on Metro is set forth in a formal agreement between WMATA and every fire chief in the region, called the Metrorail Transit Fire Emergency Procedures Policy Agreement.

MR. BLACKISTONE: Can you wrap it up in about 15 seconds?

MR. BODMER: Okay. However, on January 12th, no unified command was established. On the scene, when fire department entered the station, MTPD officers on the platform advised that

there was a train in the tunnel with passengers aboard. WMATA's procedures indicated that the fastest, safest way to evacuate passengers aboard a train is to move the train to safety. ROCC personnel attempted to move the train to L'Enfant Plaza Station that was less than 400 feet away.

The operator of Train 302 stopped in the tunnel was directed to reverse operating ends of the train and return to L'Enfant Plaza. It is important to note that the mere presence of a train at the L'Enfant Plaza Station would not have prevented the train from returning. However, the reverse move was not successful because, unbeknownst to the train operator, there was insufficient power to the third rail to allow train movement.

MR. BLACKISTONE: Okay. We're going to have to wrap this up. Maybe we can -- a little bit later --

MEMBER SUMWALT: Wait a minute. Mr. Chairman, I think this is important to hear. Can we continue with this?

MR. BLACKISTONE: Yes, please.

MEMBER SUMWALT: Thank you.

MR. BODMER: Okay. Because the ROCC wanted to move the train back to L'Enfant Plaza, the third rail power was not taken down immediately. Later, Metro learned that the fire department personnel took down power on the station platform using the emergency trip station, or the ETS box. When the operator of Train 302 in the tunnel reported to the ROCC that passengers aboard the train were self-evacuating, ROCC personnel took power

down for the entire stretch of rail between the incident train and the station.

Soon after, the fire department personnel entered the tunnel to assist the evacuation of Train 302. Throughout the incident, the train operator provided frequent, informative messages to passengers on the train. All walking passengers were evacuated by approximately 4:16 p.m. One wheelchair passenger evacuated approximately 10 minutes later using a special cart for people with disabilities.

As service was suspended and many customers were disrupted, Metro communicated frequently with the riders through its email, its text message alert system, social media, digital screens; at stations, broadcast media, public address announcements to provide information about the severity of the service disruption and identify travel alternatives.

Thank you. That concludes my report.

MR. BLACKISTONE: Thank you.

And now, Chief Hawkins, will you give us a brief, 3-minute descriptions of your agency's response activities that day?

MR. HAWKINS: Good afternoon, ladies and gentlemen.

On January the 12th, 2015, the D.C. Fire Emergency Medical Services Department responded to three separate Metro calls within 20 minutes. The focus of this hearing is the third call, which initiated D.C. Fire and EMS direct response to L'Enfant Plaza Metro Station. The first two calls, however, provide important

situational awareness about the emerging event.

The first call was at 1519 hours, report of debris fire at Gallery Place Metro Station. One engine company investigated and determined that no response was required. During this investigation, the station manager stated that there was reports of smoke at L'Enfant Plaza.

The second Metro call at 1522 hours was a report from a construction worker who saw smoke coming from a vent shaft at 9th and Water Street, S.W. Five units were dispatched to the incident. The responders found no evidence of smoke but noticed an odor. Moments later, two men came out of the exit shaft with soot around their nose and mouth. Moments later, while interviewing the men, the battalion chief overheard radio transmissions about a Metro station box alarm at L'Enfant Plaza Metro Station and began to suspect the two events were related.

At 1526 hours, a Metro station box, which included 13 units, was dispatched to L'Enfant Plaza Metro Station in response to a report of smoke in the station. The first arriving unit, Rescue Squad 1, arrived on the scene at 1531 hours and entered the Metro station by way of the elevator. The first unit to enter the station from the Metro entrance was Engine 18, who reported smoke at the mezzanine level. Battalion 2 established incident command at 1539 hours and began managing and mitigating the emergency. Rescue Squad 1, upon hearing reports of a train with smoke inside the tunnels, immediately traveled to the blue light station and

shut off power to the third rail.

At 1543 hours, while Rescue Squad 1 was responding inside the station, the incident commander requested a second alarm, including nine additional emergency response vehicles. The response apparatus and personnel reported to the predetermined staging area and were given assignments based on the incident command.

Rescue Squad 1 was the first unit to reach the train and reported to incident command at 1550 hours that there were passengers having trouble breathing. Immediately, upon reaching the train, Rescue Squad 1 began evacuation.

At 1627 hours, all passengers had been removed from the train and smoke conditions were clear. Unfortunately, one unresponsive passenger who was transported to the hospital later died from her injuries. Together, Rescue Squad 1 and other box alarm assignment companies evacuated 86 people from the train.

That's all.

MR. BLACKISTONE: Thank you very much, Chief Hawkins. At this point, I'll turn the questioning over to Dr. Gordon [sic].

DR. GREGOR: Yeah, I'd like to continue to ask a few more questions concerning radio communications. Could you please -- and this is for Mr. Ballard from WMATA. Could you please describe the performance and effectiveness of WMATA's trunk radio system during the course of the emergency response on January 12th?

MR. BALLARD: Yes, sir. On the day of the incident, there were no reported problems or radio communications problems with either the Operation Control Center staff, the train operator who was on the scene during the incident, nor from the supervisor who reported to the incident to assist the train operators at that location. So on the day, January 12th, we did not have any issues, any known radio issues during that incident.

DR. GREGOR: And that includes Metro Transit Police?

MR. BODMER: On January 12th, during this incident, we had good radio communications between staff at the scene and our police communications center. We went to an alternate channel. There was no issues with the communications on the alternate channel. In the station, some of the officers did report some bonking of the radio during this incident, especially towards the south end of the platform where they were going to make entry to go up to the incident train. But for the most part, for the entirety of the incident, the radio worked, and it worked well.

DR. GREGOR: Thank you.

Chief Hawkins, could you describe the performance and effectiveness of the District's public service radio system as it was experienced by first responders during the course of the emergency?

MR. HAWKINS: From the early stages of the incident, there was a report of communications problems. The first responders knew that they would have communication problems during

the event. The first arriving unit, Rescue Squad 1, started experiencing radio problems. They got -- the radio signal started emitting a distinct sound we refer to as "honked out" as they went down the elevator shaft. So the next procedure was to switch over to a talk-around channel, which they did, to communicate with another member of the rescue squad. Once the first arriving unit to enter the station from the mezzanine level also started experiencing radio problems -- so during the process of the event, there was numerous reports of radio problems, communication problems to manage the incident.

DR. GREGOR: How did the first responders in the station and the tunnels communicate with the on-scene command post?

MR. HAWKINS: Well, in terms of communications, a normal practice according to our standard operation guidelines for communications, the first process would be the 800 megahertz system. You will be assigned a tactical channel responding to the incident. If that started to have problems, you would switch over to a vehicle repeater system. And if that system is not successful, you would switch over to a talk-around channel. In a talk-around channel, we will form a line of sight to communicate. If that fails, we would use runners. So there's steps of process, things we do primary, secondary and tertiary, in terms of communication problems. So those was implemented as we managed the incident.

DR. GREGOR: Okay. And did you run through all of those

steps during this incident?

MR. HAWKINS: Okay. So the first assignment of the units responded on the 800 megahertz system, on the tac channel. And once they arrive on scene, once the members started to experience problems with the radio system, that information was relayed up to the incident commander. He requested that the units switch over to the vehicle repeater system. Once the units got below grade, they started experiencing problems with the talk-around [sic] channel. So the talk-around channel was implemented, and the first responders used a talk-around channel to communicate back and forth to get the message back to the incident commander.

DR. GREGOR: Essentially, formed a human chain?

MR. HAWKINS: That's correct.

DR. GREGOR: Okay. Have any new capabilities been added since the January 12th accident to address problems when you run into communications problems in a large building or an underground structure?

MR. HAWKINS: There has been a series of testing that's been going on with WMATA and OUC, as well as some key officials in our department in terms of radio testing. There has been the bi-directional amplifier that's been used and been testing in the tunnel. So we've been ongoing working with WMATA as well as OUC to make sure we have the capability. But it's been an ongoing process. And in terms of that having anything implemented, other than the bi-directional antennas, that's the only thing thus far.

DR. GREGOR: Okay. Thank you. One more line of questioning. At the time of the accident, how were communications supported between the incident commander on the scene and the D.C. Fire liaison that you would send to the WMATA Rail Operations Control Center?

MR. HAWKINS: Normal communications between the incident commander and the chief officer that we send to the regional operation command is made by 800 megahertz. That communication is aboveground. They communicate and relay information to the incident commander by way of 800 megahertz. There's been times where he may use another method to contact incident command, such as a cell phone. Most of the time the communications is 800 megahertz transmission.

DR. GREGOR: Okay. So were there any issues with that communication link during the response?

MR. HAWKINS: Yes. Sometimes the communication was intermittent. There was a problem. Once he got out there with communications, he had a problem with his radio being, once again, the term honked out, started emitting a distinct sound. So he used his BlackBerry to communicate with incident command, as well as other officials on the scene.

So, once again, you know, once the 800 megahertz system failed to operate, he switched to VRS, and then after that, pretty much he used his cell phone.

DR. GREGOR: All right. But I was talking about the

aboveground communications, so the link between the incident commander upstairs and the ROCC?

MR. HAWKINS: The communication between -- upstairs, between -- communications between the incident commander and ROCC was 800 megahertz, and then at some point he used a cell phone.

DR. GREGOR: So was the problem on the incident commander's end or at the ROCC's end or do you know?

MR. HAWKINS: It was a combination, I believe, at the ROCC, there was communications issues trying to get through from the second chief to the ROCC. I believe he mentioned that the call didn't go through. He had got placed on hold. But the communications started with a secondary chief going to the ROCC trying to communicate, establish communication lines with the ROCC.

DR. GREGOR: Okay. Has anything been addressed to try to increase the reliability of that link since the January 12 accident?

MR. HAWKINS: We have been doing training with WMATA in terms of improving our communications and identifying ways to enhance their capability. I know there's been discussion on a regional level to look at having the fire department personnel at the ROCC. So that's still being explored and discussed right now. So we've been looking at ways to improve and enhance our communication with the ROCC, fire department personnel responding.

DR. GREGOR: Okay. And the last one is for Mr. Ballard.

Are there any other resources at the WMATA ROCC that could have been used to bridge the communications gap or are you developing any new resources for that?

MR. BALLARD: That question requires a technical response, so I would have to pass that to someone with a technical understanding of how the radio system works.

DR. GREGOR: Well, and I mean not just radio systems, but telephone or WMATA radio, what have you.

MR. BALLARD: And your question relates to communication with the fire department or people in the rail system?

DR. GREGOR: Yeah, something that could have been used to help bridge that communication gap when they had a problem?

MR. BALLARD: The communication gap between the fire department and the Rail OCC?

DR. GREGOR: Correct.

MR. BALLARD: That's your question?

DR. GREGOR: Correct.

MR. BALLARD: That's a question that I would have to pass to the technical communication group, maintenance group, or the communication engineers.

DR. GREGOR: Yeah. If you could provide any information that's -- if there's work being done in that area, that would be good.

DR. POLAND: Mr. Ballard, is that something that is documented in a report that could potentially be submitted to the

NTSB?

MR. BALLARD: Because the Rail Control Center staff does not monitor or manage or track the emergency responders' radio system, if there is a report to OCC that there is an issue, then it would be placed into -- entered into the Maximo recording system. But as far as the operation control staff and myself, because we deal primarily with the operations part of the system, that is not something that I would personally address other than if we have a report of a radio issue and information is passed onto the maintenance crews to respond to.

MR. BODMER: Could I add something on that? There's two other ways that the fire department can communicate with the OCC. There's an established command conference line, which is the landline that comes from the incident commander to the ROCC. And there's also the unified command process, as well, communicating to the ROCC.

DR. GREGOR: Okay. Thank you very much. And that's all I have for now. I'd like to pass the mike to Mr. Dave Bucher.

MR. BUCHER: Thank you, Dr. Gregor.

Good afternoon. My first question I think would be for Mr. Ballard, but I think Mr. Bodmer should also be included. According to the accident times included, or provided to NTSB by WMATA, the first report of trouble on Train No. 302 came from a transit police officer located on board the train at 3:15 p.m. This officer reported that the 302 train was stopped and there was

a fire on the train, there was smoke in the tunnel, and the 302 train needed assistance. The D.C. Office of Unified Communications was first notified of smoke in L'Enfant Plaza Station at 3:22 by a WMATA official.

Can you describe what was happening in the WMATA control center during the time between 3:15 and 3:22 p.m.?

MR. BALLARD: Yes, sir. When the train operator became aware of the situation in the tunnel that prevented that train from moving forward, the train operator immediately contacted the Rail Operations Control Center via the train console radio. The transit officer may have contacted her department using her portable handset. Once OCC became aware -- let me go back and start with early incident reports of smoke in the system.

MR. BUCHER: Okay.

MR. BALLARD: When we, when Rail OCC received a report of smoke at L'Enfant Plaza prior to that, there were other reports simultaneously coming into OCC. We had a report of smoke arcing insulator on the lower upper level of Gallery Place. We had a report of smoke at Mount Vernon. And then we had a report of smoke at L'Enfant Plaza. OCC was in the process of investigating all of these incidents. And as we know post-incident investigation, that these reports at Gallery Place, at Mount Vernon, they were unsubstantiated.

So OCC, in dealing with those situations -- and also during this incident, when this incident occurred, OCC was

managing a signal problem at Anacostia. So managing the multiple incidents -- and of course, you know, the console that manages the Yellow Line, L'Enfant Plaza, also manages all of the Green Line trains, all of the Yellow Line trains, and the Blue Line trains from Franconia to Pentagon.

So in an effort to better get an understanding of what was going on, was there any, really -- you know, where the problem was, OCC initially made a call to D.C. Fire at 1513 letting D.C. Fire know about the report of smoke at the upper and lower levels at Gallery Place. Later on, as you stated, at 1522, OCC notified D.C. Fire about the smoke at L'Enfant Plaza.

Also, at 1520, 1520 and 59 seconds, OCC received a fire alarm in OCC. And immediately, within 1 minute, less than 2 minutes, OCC made a notification to D.C. Fire about the fire at -- fire or smoke at L'Enfant Plaza.

MR. BUCHER: Thank you. And a follow-up question to that, for both yourself and Mr. Bodmer, can you tell us why there was no mention of the stranded train in the tunnel at the time of the 3:22 call?

MR. BALLARD: Yes. In the investigation of the incident, trying to determine what the problem was, OCC wasn't immediately able to determine the exact origin of the smoke, whether it was in the tunnel or whether it was in the station. And the intent was always to get Train 302 back to the platform. OCC, according to their procedures and protocol, the effort was

being focused on getting Train 302 back to L'Enfant Plaza Station, and that effort continued until the power was removed by someone initiating the ETS button at L'Enfant Plaza Station and third rail power was lost. So the thought was that OCC would be able to get Train 302 back into the platform.

The issue didn't start out -- the report didn't start out there was an issue, a mechanical issue with Train 302. The problem was reported that there was a smoke incident. So based on OCC's understanding of what was occurring, a functioning train entered the tunnel at L'Enfant Plaza. OCC's thought was that this train could easily reverse and to move back onto the platform at L'Enfant Plaza. So the initial report to the fire department was related to the smoke and stuff rather than that about the train.

MR. BUCHER: Okay. Thank you.

My next question, I guess, goes to both of you again. WMATA's rail operations plan book for major incidents includes directions on steps to follow if a train encounters smoke. These instructions include protocols for stopping following trains behind a stopped train. At a previous station, records show that the 510 train, the following train to 302, arrived at L'Enfant Plaza approximately 7 minutes after the initial report of smoke from Train No. 302. Can you explain why the 510 train was not held at a previous station?

MR. BALLARD: The post-incident discussions on this incident from the staff involved, it was reported that once 510

got to the interlocking at L'Enfant Plaza, the plan was to allow 510 to continue towards Branch Avenue. Since Train 302 was in a separate tunnel, the thought was that, if the tracks were unobstructed, for the train to move from L'Enfant Plaza down towards Navy Yard. So the initial plan was to continue 302 -- I'm sorry -- 510 through L'Enfant Plaza without stopping at the station.

MR. BUCHER: Okay. Thank you.

One more for Mr. Ballard. What kind of training to you give your control center operators in communicating with emergency services agencies?

MR. BALLARD: When there's an incident, the control center staff, depending on the incident, depending on the origin of the incident, depending on the type of incident, if it's a train incident, something related to the rail system itself, inside the tunnel area or the station aboveground, then the Rail OCC assistant superintendent will notify the emergency responders, to include Metro Transit Police, our executives within WMATA, the local emergency responders. If there's something occurring, such as a smoke incident in the station, then our ROIC staff, they make a notification to the emergency responders.

The training that they receive is -- the controllers receive 26 weeks of training. And in that training, controllers are trained on how to troubleshoot trains, how to manage incidents, how to manipulate the AIM computer in OCC. There is a

phase of their training that includes what's called on-the-job training, where a controller will sit with an experienced controller for 2 weeks on each shift, and after 26 weeks, then that controller is evaluated, and it is determined whether or not that controller can be certified to become a controller. The 26 weeks is a minimum number. If it is determined that the controller needs additional training, then that controller is given additional training until either that controller is certified or that controller is removed from the position.

The training that they receive for communications is based on the incident. Our procedures tell us exactly what you are supposed to relay to the emergency responders. And during that 26 weeks training, the controllers go over those rules and procedures extensively. Also, within the control center itself, a controller is not there in an isolation, by themselves situation. There is a support system there. At each console, we have two controllers there to support each other. And along with that, we have an assistant superintendent there to assist them, you know, in all of their efforts to make notifications and to resolve issues.

MR. BUCHER: Okay. Thank you.

I'm going to pass the questioning to Mr. Downs.

MR. DOWNS: Thank you. The following questions relate to emergency preparedness training activities, and the first two questions I'm going to address to Mr. Williams of the D.C. OUC and

then Chief Goldstein of Montgomery Fire and Rescue.

First question to Mr. Williams. What training is provided to your 911 call takers and dispatchers for handling a report of an incident in a Metrorail tunnel, such as a heavy smoke condition?

MR. WILLIAMS: Our employees are all certified on the 911 side by the International Association of Emergency Dispatchers in protocols that deal with train accidents and other fire and EMS and police emergencies. They also attend a 40-hour class with APCO, which is the Association for Public Communications Officials, along with a regular training, which lasts anywhere from 4 to 8 months, depending on the position that they're going to have inside the 911 agency.

We also have participated in multiple mass casualty events, tabletop exercise, as well as actual exercises with various agencies, police, fire, military agencies throughout the District. As it relates specifically to WMATA, we have not participated in any WMATA incident or exercise training to that. We have participated in street car training with the new street cars in D.C.

MR. DOWNS: Thank you. A follow-up to that question, do you have a protocols or scripts for information to be obtained from callers during this call processing, the 911 call processing?

MR. WILLIAMS: Yes. If a call is received by a 911 call taker, they do follow a script which is part of their training

from the International Association of Emergency Dispatch. It's priority dispatch. They do follow a script from a 911 call taker. That differs from a phone call received by a supervisor. A supervisor does not have, on a non-emergency line, does not have access to that.

MR. DOWNS: Okay. Thanks very much. And I'll repeat those questions for Chief Goldstein of Montgomery County. What training is provided to your 911 call takers and dispatchers for handling a report of an incident in the Metrorail tunnel, such as a heavy smoke condition?

MR. GOLDSTEIN: As Mr. Williams stated, the protocols in use in Montgomery County are the same as in the Office of Unified Communications in D.C. Our communications call takers are driven on the chain marker. Our geo-based system through our CAD identifies the chain marker as a correct or an accepted address location, and when provided by the ROCC staff of a track number and chain marker, that is entered as if it was a street address. That's then provided to the response algorithm for that specific location, same training as Mr. Williams cited.

MR. DOWNS: Okay. Thank you. And like I mentioned before, as a follow-up, what you're saying, I think, is that protocols and scripts for information to be obtained from the callers would likewise be provided?

MR. GOLDSTEIN: Correct. We utilize the same protocol system now. We started that back in the April time frame. Prior

to that, we were not on a fire protocol. We were only on the medical protocol, but our 911 system operates both police -- excuse me -- EMS Fire protocol and soon to be the police protocol from the same vendor.

MR. DOWNS: Thank you.

Next question will be for Mr. Ballard of WMATA. What training is provided to train controllers for handling any report of an incident in a Metrorail tunnel, such as a heavy smoke condition that's received from a train operator or other WMATA employee?

MR. BALLARD: As part of that initial 26 weeks training, there is a review of the rules and procedures. And in those procedures, it lists how the control center, how the train operator, how the supervisor are supposed to respond based on smoke incidents. There is a separate procedure -- I think it's number 6 -- dealing with smoke/fire on the roadway. There's another procedure dealing with fire/smoke on the train. And then there is a separate procedure dealing with fire in the station. And all of the control center staff, train operators, supervisors, are trained on how to respond to incidents as it relates to fire and smoke.

MR. DOWNS: Thank you. And similarly, for WMATA, as occurs with the 911 system, are there protocols and scripts available for the train controllers, for the information to be obtained from the person making that report?

MR. BALLARD: We don't have any specific scripts, and we're looking going forward to -- based on the reports from by the NTSB, FTA, we're looking at adding additional scripts for -- not only for phone calls made to the emergency responders; we are also going back and reviewing our scripts for handling other incidents. There's never been an issue where we feel that the adequate information has not been passed or there has been some kind of report back to us that something that should have been reported during the call to the emergency responder was not relayed to them. But we can always get better. There's always an opportunity to look at things differently. So we're looking at adding scripts just for calls to emergency responders.

We've always had scripts for our train controllers in managing incidents and they weren't always in use. But going forward, we reviewed these scripts. We are making sure that we have all of our procedures covered in the script fashion, and we're going to add that as a part of our future incident reporting of incidents that occur in the system.

MR. DOWNS: Okay. Thank you. Just to make sure I'm following this, pre-event as well as the event itself there were no scripts engaged or employed, but there was a lesson learned, more or less, as a result of the event that now you're going to be utilizing that particular process? Would that be a fair characterization?

MR. BALLARD: There were no scripts specific to phone

calls to emergency responder. There were scripts available for managing incidents.

MR. DOWNS: Scripts available -- we're talking about to the particular train operator or any other WMATA employee in the field that experiences a problem?

MR. BALLARD: The train operators don't have a specific script. The train operators are trained. They're recertified every 2 years on incident management --

MR. DOWNS: I'm sorry. Let me clarify. Calls to the ROCC from a train operator. In other words, scripts utilized by the ROCC?

MR. BALLARD: No. Maybe I'm misunderstanding your question. If I understand you correctly, the scripts that we have relate to incidents that occur and could possibly occur in the system that correspond to our procedures, the controllers have those scripts. They weren't always being used. We are making sure, going forward, that the controllers are consistently using those scripts based on reported incidents that occur in the system. The train operators do not have a particular script for incident reporting. The operators are trained on how to report information to the control center as to what they are experiencing and what they see in the system.

MR. DOWNS: Okay. Thank you.

DR. POLAND: Mr. Downs?

MR. DOWNS: Yes?

DR. POLAND: Would it be valuable for you to see those scripts from the controllers?

MR. DOWNS: Yes, it probably would be, yes.

DR. POLAND: Mr. Ballard, could you please provide those scripts that you were referring to from the controllers for exhibits --

MR. BALLARD: Yes, I will.

DR. POLAND: -- for this hearing?

MR. BALLARD: Yes, I will.

DR. POLAND: Thank you.

Do you need some additional information, Mr. Allen, on that?

(No audible response.)

DR. POLAND: Thank you.

And I was also told that I could ask Chief Goldstein for that same type of information. Could you also provide your scripts for the NTSB to enter into the docket?

MR. GOLDSTEIN: That'd be correct.

DR. POLAND: So that would be a second set, Mr. Allen, from Montgomery County. Thank you.

MR. DOWNS: Thank you, Dr. Poland.

Next question I'd like to direct to Chief Hawkins, D.C. Fire. Could you please describe the command post that was established by the D.C. Fire and Emergency Medical Services incident commander?

MR. HAWKINS: Yes. So the incident commander was Battalion 2. He responded to the scene, and he established an incident command post right at the main entrance of L'Enfant Plaza Metro Station. And prior to that -- once he arrives on the scene, he established incident command. He identifies the command post. And this would be -- a Metro emergency would be a multi-agency problem, so he'd establish unified command. And that's when he links up with the Metro official on the scene, establishes that unified command post.

MR. DOWNS: Okay. Thank you. Were the transit police on-the-scene commander and other first responder agency commanders included when the incident command post was established on the scene?

MR. HAWKINS: That is correct. Once the battalion chief incident commander responded to the scene, there was a Metro official there. There was some coordination in terms of communications between the Metro official and D.C. Fire and EMS incident commander. The incident commander was trying to put a command structure in place to mitigate the emergency. There was a lot of information that was coming through the radio channel as well as reports from OCC from the second chief. So he was, you know, managing that incident and at the same time communicating, or attempting to communicate, with the WMATA Metro Transit Police officer at the incident.

MR. DOWNS: Okay. Thank you.

I want to do a follow-up question to Mr. Bodmer. In your summary a few minutes ago of the WMATA response to the event, you indicated that the WMATA transit police chief attempted to confer with the D.C. fire department incident command. Could you please elaborate what you meant by attempted?

MR. BODMER: Yes, sir. Deputy Chief Olson was our on-scene commander at the L'Enfant Plaza incident. He originally responded to the station prior to the District fire department arriving, and as they were coming in, he responded topside.

With any Metro box assignment, there is a lot of apparatus that comes to this. There's many different vehicles that come to this. There's SUVs that usually the command officers have. He perceived the one SUV as a captain, if they were incident command, and they said no and pointed to the direction of another one. So he proceeded to that SUV to talk to that battalion chief. As he was approaching the battalion chief and tried to engage the battalion chief about situational awareness of what was going on in the station, and the battalion chief rolled the window up and drove off.

He then reattempted to contact the battalion chief, who ended up at 7th -- our 7th and our D Street entrance, and that's where command was established. Once again, he tried to engage him. He had important information for that battalion chief. And again, he was not welcomed into the unified command process. We don't even think unified command was ever established on that

call.

MR. DOWNS: You say he was not welcome was the impression that the officer received at that time?

MR. BODMER: Repeatedly, he tapped on the glass of the SUV where the battalion chief was, he rolled down the window a little bit and then rolled it back up on our deputy chief. And our deputy chief had critical information that needed to be passed on to that battalion chief who was the incident commander.

MR. DOWNS: Thank you. I'd like to give Chief Hawkins an opportunity to respond to that --

MR. HAWKINS: Yes. So to respond to that, once the incident commander arrived on the scene, there was a issue with trying to locate the main entrance. The driver, which is his aide, he moved the vehicle from one location to the next. So that explains why the vehicle may have been moved. Also, in addition to that, the incident commander was getting a lot of reports of smoke. He was getting a lot of radio transmissions. He had firefighters down in harm's way, so he was trying to prioritize the information as it came in.

And if he didn't communicate through the window because he was in the process of prioritizing and making a decision on -- to prioritize the information and give the firefighters below communications. So at some point, incident command did take place. It may not have been right, immediately when the conversation took place at the window, but the incident commander

was in a environment whereas though he had firefighters in a tunnel, and he was trying to get the reliable boots-on-the-ground information to make decisions at that split second there.

So the process, it may have not went smooth as we would like it to be, but we're doing things right now to improve that with WMATA, in terms of joint operation training. So moving forward, we're looking at ways to improve that. But incident command, unified command, was established, and there was communications between the Metro officials and the incident commander at some point, a critical moment, during the emerging event.

CHAIRMAN HART: Let me just caution that we're moving a little bit afield here because we're getting into a lot of he said, she said hearsay, speculation, and I don't want anything but facts. So let's try to keep it as much as we can to the facts.

MR. DOWNS: Thank you, Chairman.

That concludes my questions.

Mr. Blackistone?

MR. BLACKISTONE: Thank you.

First I want to follow up on a conversation that we had a few minutes ago regarding communication of location information regarding incident. And I know Chief Goldstein made the comment that they try and seek out detailed information regarding the chain marker location of any particular event. And my question, which goes really both to Mr. Ballard and to Mr. Williams is when

did the ROCC, the WMATA facility notify D.C. OUC of the location of the train, or when did they notify them that there was a problem on the train, as opposed to in the station?

MR. BALLARD: At 3:22 p.m., the Rail OCC contacted the D.C. Fire control center to notify them that there was a smoke incident at L'Enfant Plaza. As I said earlier, the intent at that point was to have the train, 302, return to the platform at L'Enfant Plaza. The efforts to move that train back to the platform continued until the fire department arrived at L'Enfant Plaza and activated ETS button, and the train was no longer able to move back to the platform. There was never a thought that the train would not be able to move back to the platform. It was never determined prior to that that the train was stalled in the tunnel.

OCC continued their effort to move the train back to the platform in anticipation that the train would move back to the platform. If OCC had become aware, as they eventually did, that the train could not move because as the train operator -- after the train operator reversed to the opposite end of the train, the operator determined that the train was not able to move under its own power, and the train operator began to troubleshoot the train.

So when OCC made the initial report to the fire department, the report was only for the station area itself that reported smoke being at L'Enfant Plaza Station. So there was no specific report to D.C. Fire that there was a train stopped in the

tunnel.

MR. BLACKISTONE: All right.

Mr. Williams?

MR. WILLIAMS: The first time we became aware of it was at about 1533, so 3:33, we received a call from a passenger on the train who advised he was on a Yellow Line train in the tunnel and it was filling with smoke. We received additional calls following that from citizens or a train -- people who were on the train advising of the same thing, that one person said he was on a train to the Pentagon, and he called at about 1533, as well.

The importance of that is that changes the response we would dispatch to D.C. Fire and EMS, and also who would we contact since the train was in the tunnel towards the Pentagon. And we would have notified Arlington County in that regard, because that's the protocol. If a train is in a tunnel, we're going to notify -- either send units -- if it's inside D.C. itself, we're going to send units to both entrances to that tunnel, both -- when I say both entrances, the two Metro stations to that tunnel, or in this case, since the line was between Washington D.C. and Arlington County, we would notify Arlington County that there is a train in the tunnel.

And not knowing how far the train was in the tunnel, in this regards, you know, where are those train riders going to exit that train. And that's where Chief Hawkins was talking about people came out of a vent shaft, which was a surprise to the units

there, because they had no idea there was a train in the tunnel.

MR. BLACKISTONE: Then that perhaps answers my follow-on question is what are the different dispatches between a station box alarm and a tunnel box alarm for incident between two stations.

So did you ever receive information from ROCC that there was a problem on a train in the tunnel?

MR. WILLIAMS: No. Based on our investigation, the only calls we received from the ROCC were the initial call for L'Enfant Plaza and then for -- the two calls for L'Enfant Plaza. There was the call for Gallery Place, but then the two calls for L'Enfant Plaza, the first one advising smoke, and then the second one advising EMS was needed and also that there was smoke in the station.

MR. BLACKISTONE: And let me follow up with Mr. Bodmer. Would it have been possible for Train 302 to have moved back to the station when the following train, Train 510, was sitting in the station? Or maybe it's Mr. Ballard that needs to answer that? Thank you.

MR. BALLARD: Yes. Let me clarify something earlier. OCC received the report from Train 302 that it was stuck in the tunnel. The call was made to the fire department about, like, 5 minutes later. When the fire department arrives on the scene, then the expectation is that the fire department was in control of the incident, that we had transit police who were aware of the

situation at L'Enfant Plaza, who could have communicated that information to the fire department. So once the fire department arrived on the scene, then the expectation is that the fire department would gather all of their information needed thus far as how the incident was progressing from the persons at the incident scene, which was Metro's representative, and that is the on-scene commander, transit police.

To answer your question about Train 510 being on the platform at L'Enfant Plaza, as the reports reveal, Train 510 was not -- it stopped on the platform with space for at least two cars, 150 feet left for another train to move onto the platform. Having 510 train on the platform at no point prevented Train 302 from moving back into the platform area at L'Enfant Plaza.

When we have situations where trains are, say, are stalled, unable to move, what we do is we use what we call a rescue train. And normally, the rescue train will move towards the stalled train. In this situation, it would have been just the opposite. Train on the platform, 510, would have been the stalled train, and Train 302 would move back towards Train 510, getting as close to the train as possible without coupling. The train doors would be on the platform, and the customers would be evacuated from the cars that were on the platform itself.

So having Train 510 on the platform did not at any time prevent Train 302 from being able to move back to the platform. But what we found out from our investigation is that there was not

sufficient third rail power being supplied to Train 302, so that's why Train 302 did not return to the platform at L'Enfant Plaza, not because Train 510 was there.

MR. BLACKISTONE: Would there have been an issue with -- am I correct there is an interlocking switch immediately outside the station there?

MR. BALLARD: Yes.

MR. BLACKISTONE: Would there have been a problem with that switch having been moved to a position that would prevent the train from coming back, reversing back into the station? Or what procedures would you do in order to assure that that was not the case?

MR. BALLARD: What you can do -- let me try to explain this without being technical. What you can do is you can set a route towards -- from L'Enfant Plaza towards Pentagon, just as it was set for Train 302 to leave Pentagon -- I'm sorry -- leave L'Enfant Plaza. Then you would have the operator reverse ends on the train, give the operator an absolute block back to the platform at L'Enfant Plaza, with permission to pass a red signal at L'Enfant Plaza. So OCC was always able to properly align the switches to allow Train 302 to return to the platform at L'Enfant Plaza.

MR. BLACKISTONE: Okay. All right. Thank you. We may want to pursue that further later.

But I wanted to turn to Chief Goldstein and ask you to

talk a little bit about your experiences in Montgomery County. I understand that there have been a number of -- you have responded to a number of incidents, particularly in the Bethesda area, in recent weeks regarding smoldering wires, arcing insulators, that sort of thing. Could you share with us a little bit what the experience of your department has been in those responses?

MR. GOLDSTEIN: Thank you very much. Through calendar year 2012, 2013 and 2014, our average was about 20 incidents a year throughout the Metro system to a smoke or brake incident through a medical emergency involving a patient in the roadway. Those calls, that 20 to 30 calls per year do not include any events that are medical in nature that do not involve the roadway itself.

Throughout those experience of time, we saw an uptick in the Bethesda Medical Center and Friendship Heights area. Our concentration of brake or insulator call types were proportionately higher along the A line red track, or excuse me, the Red Line, A tracks in those areas. For the first 6 months or up until yesterday afternoon, for the first 6 months of 2015, so far, we've seen about a 500 percent increase in our calls for service specifically in our smoke, insulator or brake concerns. We've had 51 calls so far in the first just shy of 6 months this year compared to 22 calls cumulatively in calendar year 2014.

When we break those out and look at the location of those events, unproportionately, those numbers are Bethesda or

Medical Center. When you look at the events so far this year, as of yesterday afternoon, we've had 18 events in the Bethesda area and 10 events in the Medical Center component, and then a cumulative of four identified as Friendship Heights.

As we talked earlier with Mr. Williams, we will dispatch resources to the primary point of entry based upon the information from the ROCC, be it Bethesda, and we'll send a reduced amount of apparatus to the next closest entry point. Sometimes that Medical Center, sometimes that's Friendship. But that response counts as one event, where our primary point of entry or our primary dispatch point is identified for that incident.

MR. BLACKISTONE: Thank you. And just to note for the record, all of these are underground stations, underground areas that we're talking about here.

MR. GOLDSTEIN: Correct.

MR. BLACKISTONE: In your responses, could you talk about whether you've had communications issues, how well the radios have worked, or what you've used as work-arounds in case they haven't?

MR. GOLDSTEIN: The underground public safety radio system, as described earlier by one of your technical panel members, is comprised of amplifiers on the exterior that take the public safety system of the host jurisdiction down and then reamplify it underground and through a set area of track through an antenna that's strung along the walls, as is with the cellular

system. That system is in place. That system works. But that system is also highly delicate and requires a high level of maintenance.

Prior to the L'Enfant incident, Montgomery County was testing our radio coverage once a month by sending our radio technicians on the tracks, on the trains, and on the platforms to test communications back. Since the process of the L'Enfant event, in conjunction with WMATA transit folks, there has been an improved testing process by both public safety agencies as well as WMATA staff. There's been an improved radio reporting component as well as a radio outage map, a real-time system by which 911 center operators and radio system managers can look at the status of any outage reports throughout the Metro system and identify the repair status of those reports. So the system is in place. The system works. It is delicate and needs a high level of maintenance to maintain that capability.

MR. BLACKISTONE: Thank you. And then let me ask about another element of communications, and that is in terms of the information that you receive from WMATA about incidents. Are there issues with receiving either incomplete or inconsistent information when units respond and are on the scene, such as between WMATA people on the scene versus what they're hearing from the ROCC?

MR. GOLDSTEIN: As it relates to the question of incomplete and inconsistent, that would be hard to judge and each

incident is unique and upon itself. Oftentimes, when we ask the controllers from the ROCC who is calling for the track marker or the chain marker, that causes a delay because that person is calling because of an event in Bethesda or an event at a specific station.

And as I mentioned earlier, we geo-locate that based upon a chain marker. That's easily overcome by the controller asking somebody else in the ROCC. But we do have occurrences where the information being relayed on the call to the Montgomery County 911 Center is initial and is then followed up with additional phone calls from the ROCC to the 911 center. And then once we have an on-scene incident commander present with Metro Transit, we have an effective means of communications that we are able to bridge there.

MR. BLACKISTONE: Okay. Thank you very much. We appreciate that.

Dr. Poland, that completes our Panel's initial round of questions.

DR. POLAND: Chairman Hart, that concludes the technical panel questions for Panel 2.

CHAIRMAN HART: Thank you, Dr. Poland. We will now take a 30-minute break. We will return to the room at 20 minutes after to resume, and I ask that the witnesses come back a few minutes earlier to be seated. Thank you very much.

(Off the record at 2:53 p.m.)

(On the record at 3:19 p.m.)

CHAIRMAN HART: Welcome back. We're now going to proceed to the questioning by the parties. The parties will each have 5 minutes to ask the witnesses questions. After that time, I'll ask the parties if there's a need for a second round of questions if we have time. I'm going to have the D.C. EMS be the last one to ask questions, so the first one, then -- we're going to go counterclockwise around the table, so I would like to start with Mr. Madaras and the Amalgamated Transit Union.

Do you have any questions for these parties?

MR. MADARAS: Chairman Hart, thank you. I do have a few questions. My first question is for Chief Hawkins. If unified command was established, did the battalion chief make an effort to communicate through transit police when he determined that the radios weren't working?

MR. HAWKINS: Yes. The battalion chief did communicate with the Metro Transit Police when he assumed unified command. Like I said, initially, when they first got there, there may have been a delay in terms of the Metro Transit Police officer and the window being rolled up, but they did communicate about the incident once he got to command post. So that did take place.

MR. MADARAS: So just for clarity, so there was communication between the battalion chief that was aboveground and the fire personnel that were down on the platform?

MR. HAWKINS: Yes, there was communications. At some

point, we lost communication, but it was sporadic, intermittent, so communication did take place at various points during the incident.

MR. MADARAS: Okay. Thank you.

My next question is for Mr. Ballard. What is the procedure for the on-scene commander to communicate with ROCC?

MR. BALLARD: In the SOP manual, it has identified specific operation persons who can be the on-scene commander. Normally, the on-scene commander, in most incidents, would be the train operator. Once the supervisor arrives on the scene, then the supervisor takes over as the on-scene commander, and it goes up the chain up to the manager director, which is me.

The on-scene commander on the operations group, they report to Rail OCC. They communicate directly to OCC. Once there is a situation requiring a external agency to respond to an incident, and then transit police is in charge, and they the on-scene commander when they arrive on the scene. And then transit police communicates with the rail person who's there and with the external agency that has responded to the incident. And transit police then responds to their control point, not the Rail OCC.

MR. MADARAS: And to follow up, briefly, do you know, was there communication between the on-scene commander and ROCC?

MR. BALLARD: Which on-scene commander, the rail on-scene commander or transit?

MR. MADARAS: The transit police on-scene commander.

MR. BALLARD: As I stated earlier, once transit arrives on the scene and they take over responsibility for the incident, then transit police respond to -- report to communicate with their control point, which is not Rail OCC.

MR. MADARAS: Okay. Thank you.

I have one more question. My question is to Mr. Bodmer. I'm not sure you can answer this, but if you can, please provide an answer. It was referenced in one of the interviews that when you hit a fan, the SCADA system tells you everything that you need to do. Would that system have provided the information to determine which way to set the tunnel fans to exhaust or supply? Do you know?

MR. BODMER: I'd have to refer that to the technical panel, the infrastructure panel.

MR. MADARAS: Mr. Ballard, could you answer that? Do you know?

MR. BALLARD: Let me get a good understanding of your question. Let me answer you based on my understanding of your question. In the control center itself, the controllers have the ability to turn the fans on, turn the fans off, turn the fans to supply, and turn the fans to exhaust from the AIM computer in OCC. So did that answer your question?

MR. MADARAS: Well, the one person who referenced it in their interview said that if you turn on a fan, that if you punch up the SCADA system, it will tell you exactly how to set the fans

to exhaust or supply.

MR. BALLARD: What we've done in our system --

DR. POLAND: Mr. Ballard, could you pull the microphone a little closer, please?

MR. BALLARD: Yes.

DR. POLAND: Thank you.

MR. BALLARD: I'm sorry. What we've done is, after this incident, we've gone and we have provided additional training to the OCC staff to inform them how to configure the fans based on specific incidents that occur, a train stopped in the tunnel, as we had at L'Enfant Plaza on January 12th, a fire in the station, smoke incident in the tunnel, even when there is not a train available. The controllers have the -- they get the initial training on how to configure the fans in their training.

And on an ongoing basis, as was said by the earlier panel, the controllers get an opportunity to practice fan configuration on a regular basis, such as, as Mr. Grooman said earlier, when there is maintenance activity occurring, if you use the system, you know that there's -- that's a regular occurrence of maintenance activity especially on the weekend. Controllers get a playbook, and it provides them with information on how the fans should be configured to move the smoke away from the workers at the incident. If we get a report of dust in the tunnel, the operators, controllers then operate the fans. If we get a report of hot brakes on a train, we configure the fans. We get a report

a person is working in the system, welding, whatever.

So the controllers get the initial training. They get the opportunity to exercise the fans based on specific incidents occurring. And during the testing process, when the maintenance groups enter the system in an effort to test the equipment, they contact OCC, and OCC activates the fan based on requests by the maintenance groups.

MR. MADARAS: Thank you.

DR. POLAND: Mr. Ballard, can I ask you a question about that playbook? Is that something that the NTSB already has?

MR. BALLARD: I'm not sure if you have it or not.

DR. POLAND: Could you -- wait, we do have the playbook? Is it already an exhibit?

Okay. We'll confirm that it's already in the docket. Otherwise, if it's not in the docket, we'll put that in the docket. Thank you.

MR. BALLARD: Thank you.

CHAIRMAN HART: Okay. Thank you, Dr. Poland, and thank you, Mr. Madaras.

IFF, Mr. Hudson, any questions?

MR. HUDSON: Just one quick question. In reference to communications -- and this is for Chief Hawkins -- between the battalion chief and the ROCC, the fire department's liaison that was sent to the ROCC, you stated that they had radio problems. Was that with the base station radio as well as their portables?

MR. HAWKINS: That's correct. They had experienced a problem with the base station radio at OCC.

MR. HUDSON: What was the problem with the base station radio?

MR. HAWKINS: One of the problems reported was they could receive, but they couldn't transmit out, so the communications back to incident command took place by way of his Blackberry, fire department Blackberry.

MR. HUDSON: Okay. Was that radio still operating non-encrypted or encrypted, the base station radio?

MR. HAWKINS: I can't remember. I believe it was -- I can't remember if it was encryption or not. I can't --

MR. HUDSON: Maybe Mr. Williams if you know --

MR. WILLIAMS: I'm not aware.

MR. HUDSON: Okay. That's it.

CHAIRMAN HART: Thank you, Mr. Hudson.

Mr. Dougherty, WMATA?

MR. DOUGHERTY: Thank you, Chairman Hart.

This question is for Mr. Bodmer. And could you answer what -- was the WMATA actively engaged in troubleshooting the radio issue with D.C. Fire and unified command?

MR. BODMER: In reference to?

MR. DOUGHERTY: In reference to prior to the incident of January 12th, sorry.

MR. BODMER: Yes. WMATA's radio maintenance team was

out troubleshooting the problem. They determined that it might be in the comm. room at One Judiciary Square. They contacted reps from the OUC, and they scheduled an appointment on January 14th to gain access to that room.

MR. DOUGHERTY: And you know, as far as for access to the room, how did WMATA attempt to gain access to the D.C.-controlled site?

MR. BODMER: I believe that room belongs to the District of Columbia government, and they would have to allow access into that room.

MR. DOUGHERTY: And you had stated the schedule was for January 14th --

MR. BODMER: January 14th, sir.

MR. DOUGHERTY: Thank you.

Next, if possible, I'd like to request Exhibit D1, which is the Metrorail Transit Fire Rescue Emergency Procedures Policy Agreement. Okay. And this question is also for Mr. Bodmer. What is WMATA's role according to the Metropolitan Washington Council of Government's Agreement with fire departments?

MR. BODMER: The agreements that we have between the council of governments and all the jurisdictional fire departments that provide fire rescue services for the Metro System is a very defined working relationship that we have. Metro does not have its own fire department, so we rely on the jurisdictional fire departments to provide that service to the WMATA system.

The Passenger Rail Subcommittee, which is a subcommittee of the COG Fire Chiefs Committee is the one that are tasked with maintaining and updating that agreement. The agreement is revised approximately every 3 years. We just had the 2015 agreement signed off, I believe, on Monday of this week. It's signed off by the WMATA general manager, CEO, and all the jurisdictional fire chiefs in the COG region.

In the agreement, the agreement speaks to a couple things. It speaks to incident notification. It speaks to fire rescue emergency response. It refers to command and control. It refers to removal and restoration of third rail power. It talks to rail car movement and evacuation. It talks about the release of information. It talks about hazardous materials detection and operations. And it has a section there on the evacuation carts and the EMS storage cabinets that we have in our underground system and aboveground system. New to the agreement in 2015, they added a regional Metrorail radio communications section and a training section in that new agreement.

One of the big pieces of the COG agreement is command and control. In the COG agreement, it is governed by the National Incident Management System, NIMS. And part of NIMS is ICS, the Incident Command System. So it defines who is in charge of the incidents with the fire department response to Metro incidents, and that's the fire department. They are the incident commander. They are in charge of that. Part of that is the Metro on-scene

commander. So any time there is a jurisdictional fire department response to a Metro incident, the on-scene commander is the Metro Transit Police. Usually, it's the first officer arriving on-scene if the fire department is there. In this case, it was a deputy chief. And the on-scene commander -- we've been doing this since July of 2000, so it's nothing new to us. In fact, we're coming up on our 15-year anniversary of this. And we're always looking to improve our relationships with the jurisdictional fire departments on these incidents.

But the big thing about the on-scene commander is the on-scene commander is the one person that the incident commander can get real-time information about what's going on with that Metro incident. In the case of January 12th, he would have known that there was a train stuck in a tunnel with people in distress. He would have known where the trains were. He would have known what the third rail power status was. He would have known if the fans were on or off and what direction they were in. And that's the beauty of a unified command. You would get all that information, and then you could make decisions based on information that you were given. The on-scene commander is assigned[2] by the incident commander. He is not listed as the on-scene commander, as far as the agreement, but he is in the ICS format in the unified command.

[2] Mr. Bodmer noted a correction. He stated the text should read "gets assignments" instead of "is assigned".

Any time we have a Metro incident, it's usually a multi-jurisdictional incident, based on where you are and the amount of folks that are coming to the incident. When it works, it works well. When it doesn't, okay, things can go -- things can happen. We experienced a very good unified command across the region. In fact, in 2006, 2007, the transit police went over to Arlington County. We were welcomed by their fire department, and we actually had lieutenants, captains and some sergeants ride along with their battalion chiefs on the different shifts just to learn that side of the incident command and how the fire service does it. And I think that was very, very beneficial to our officials on that.

So it's nothing new to us. It's protocol. It's automatic. We seek the incident commander out. That's what we do on these calls, and that's what we did on this L'Enfant Plaza call.

MR. DOUGHERTY: I'd just like to ask one last question.

DR. POLAND: Mr. Dougherty, I'm sorry to --

CHAIRMAN HART: Mr. Dougherty, your time is running kind of short. Thank you. You can bring that up on the second round if we have time.

DR. POLAND: Chairman Hart?

CHAIRMAN HART: Yes.

DR. POLAND: It's my understanding that Exhibit D-1 has recently been updated, the Metrorail Transit Fire Rescue Emergency

Procedures Policy, that there is a June 2015 version of that. Could WMATA please submit that so that we can enter that into the -- as an exhibit into the docket?

MR. BODMER: Yes, ma'am.

DR. POLAND: Thank you.

CHAIRMAN HART: Thank you. Next party to question would be Federal Transit Administration.

Mr. Littleton, you have any questions?

MR. LITTLETON: No question from the Federal Transit Administration.

CHAIRMAN HART: Thank you.

Tri-State Oversight Committee? Ms. Baryshev?

MS. BARYSHEV: No questions --

CHAIRMAN HART: Thank you.

D.C. EMS, Mr. Geldart?

MR. GELDART: Thank you, sir. I have a few questions. I'll start with Chief Hawkins.

Were there any issues at any time with the Fire and Emergency Medical Service's radio communication aboveground at the incident site?

MR. HAWKINS: The only issue that was noted was the OCC. When the battalion chief, second chief got to OCC, he had problems communicating with his mobile, and then at the base station at OCC.

MR. GELDART: Did the chief attempt to do anything to

establish radio communications once he realized he didn't have communications inside the ROCC?

MR. HAWKINS: What he did was he went -- he sent his aide back to his command vehicle, and he went back out to the command vehicle at some point to obtain situational awareness.

MR. GELDART: Did he have communications when he went back to the vehicle?

MR. HAWKINS: That's correct.

MR. GELDART: So once he went outside, he had communications?

MR. HAWKINS: Yes.

MR. GELDART: Okay.

A question for Mr. Ballard or Mr. Bodmer, either/or. Going through the timeline of events here, as stated earlier, there was a -- the attempt was, all along, to move the train back to the station. 1515 along the timeline is when the train was stopped in the tunnel. About 1522 was the first communications to the Office of Unified Communications that there was smoke in the tunnel, nothing about a train in the tunnel, or smoke, excuse me, in the station, nothing about the tunnel. We have 1531 is the time when FEMS are at the scene, excuse me, are dispatched. We've got 1539 when they actually established incident command of which then you build unified command off of. And at 1540, one minute after that, is when the blue light was pushed, or the rail was de-energized by firefighters down in the tunnel.

So by my math, and I could be wrong, Mr. Hart, but my math, that's about 25 minutes that went between the time when the train stopped and the time the blue light was pushed or FEMS de-energized the third rail. At any time in there, did that train move, 302?

MR. BALLARD: Once 302 came to the stopped position in the tunnel at L'Enfant Plaza, it was not able to move afterwards. Our post-incident investigation revealed that Train 302 entered an area where there was insufficient voltage to allow the train to move. The train went on emergency lighting, and the ventilation system stopped. It was not until we did a post-incident investigation that we really learned that sufficient voltage was not available at the location which would have allowed Train 302 to move back to the platform at L'Enfant Plaza.

As I stated earlier, based on the information that OCC had available to them at that time, a decision was made to, as our procedures require, to move Train 302 back to the platform at L'Enfant Plaza because it's the safest course of action, you know, to get customers into a safe environment. As a last resort, we would have done -- we'd take any other action, but the intent was always, based on our procedures, our protocol, to move Train 302 back to the platform at L'Enfant Plaza.

MR. GELDART: Okay. But it wasn't going to move. That's what you said, sir.

MR. BODMER: If I could add to that, Mr. Geldart, is

that's the purpose of the unified command, the purpose of sending somebody to the Rail OCC. That's why D.C. Fire sends somebody down there, is there's things that are going on in the Rail OCC that the incident commander may not know about, and that's maybe the movements of trying to get that train back to the station, as far as what the OCC is trying to do. Where the fire department may be trying to go in there and do the rescue or evacuation of the train, okay, OCC is trying to get that train back. So the coordination of that is key.

MR. GELDART: Right.

MR. BODMER: And when that ETS button was hit in the station, it took all the power down in the station, so that option was kind of out at that time.

MR. GELDART: Okay. But from the -- from what was just said, the post-incident review of that revealed that there was no sufficient power to move that train regardless, and it would not have been there?

MR. BALLARD: That's correct.

MR. GELDART: Okay.

I just want to turn to Chief Hawkins. That'll probably be the last I'll have on this round.

Chief Hawkins, a lot has been talked about here with incident command. I mean, we just talked about how quickly things happen on the scene. By the time incident command was established, not even a minute later, we were at the scene and our

first responders were actually effecting the response underground in the tunnel. Has there been anything done since the event to exercise with WMATA to work on how we do that unified command?

MR. HAWKINS: Yes. Post-L'Enfant Plaza, January 12th, we've been engaged with WMATA doing exercises, training, Metro safety training. We're doing joint supervisor training. We're looking forward to doing some exercises with them. So moving forward, we have been really engaged with WMATA.

MR. GELDART: So we have conducted an exercise with them that involves incident command?

MR. HAWKINS: We did a tabletop exercise pre --

MR. GELDART: Okay.

MR. HAWKINS: -- but we, moving -- we're looking forward to an exercise sometime this summer. But we've been doing joint supervisor training once a month with WMATA since the incident.

MR. GELDART: Very good. Thank you.

MR. HAWKINS: And that would address any issues, command and control issues, understanding roles and responsibilities, unified command.

MR. GELDART: Okay. I believe I'm out of time.

CHAIRMAN HART: Thank you, Mr. Geldart.

I think we have time for a second round. Does ATU, Mr. Madaras, have any further questions?

MR. MADARAS: No further questions.

CHAIRMAN HART: Thank you. AFF, Mr. Hudson?

MR. HUDSON: One quick question, and this is for Mr. Bodmer. In a perfect world, in non-hostile conditions, how long would it take for ROCC or the operator to change direction of that train? So to realize there's a problem, power down, change ends, power back up, and move the train?

MR. BODMER: I'll refer that to Mr. Ballard.

MR. BALLARD: In a perfect world, depends on the length of the train. We currently operate six-car trains and eight-car trains. Each car is 75 feet long. So it depends on the time of day, number of customers on the train, as to the operator's ability to quickly move from one end of the train to the opposite end of the train. So it varies based on, you know, conditions at that time. You say it would power down, power up? You had a question about power?

MR. HUDSON: It's my understanding that when the operator changes ends, they power down one end to go to the other end of the train to power back up to move the train, correct?

MR. BALLARD: Yes. We call it a keying down, keying up. It's basically like turning your car on and off. I mean, the train operator is instructed to go to the opposite end of the train. The train operator turns a key; the train powers down. The train operator goes to the opposite end of the train, insert the key, turn it, train powers up. So it's similar like your car.

MR. HUDSON: Fairly -- okay.

That's all. Thank you, Mr. Chairman.

DR. POLAND: Mr. Ballard, would you be able to give us a time estimate for that in a best case scenario, how long it would take to do that activity?

MR. BALLARD: The best case scenario would be an empty train and a short train, so I would say it would take maybe -- it depends on the operator -- 2, 3 minutes, I would think.

DR. POLAND: Thank you.

CHAIRMAN HART: Thank you, Mr. Madaras [sic].

Mr. Dougherty, WMATA?

MR. DOUGHERTY: Thank you, Chairman Hart.

This question is for Chief Hawkins. If unified command was established, did the fire department commander use the transit police radios to communicate with firefighters underground?

MR. HAWKINS: Let me make sure I understand the question. You're asking if unified command used Metro Transit Police officers to communicate with firefighters on the ground?

MR. DOUGHERTY: Yes, sir.

MR. HAWKINS: No, sir.

MR. DOUGHERTY: Okay.

MR. HAWKINS: We did not.

MR. DOUGHERTY: And Mr. Bodmer, does WMATA believe unified command was achieved successfully on January 12th per the MWCOG agreement?

DR. POLAND: Can I interrupt --

MR. BODMER: No, sir, we do not.

DR. POLAND: Can I -- I was going to ask you to answer that as factually as possible. Thank you.

MR. BODMER: Okay.

MR. DOUGHERTY: You want me to rephrase the question?

DR. POLAND: The question --

CHAIRMAN HART: Yes, could you rephrase the question?

DR. POLAND: -- had a potential for speculation, so we were asking for a more factual question.

MR. DOUGHERTY: Okay. And, Mr. Bodmer, had unified command been established successfully, could have the transit police radios been used for this incident?

MR. BODMER: They could have. Our radio system was working. We were communicating with people that were on the ground. We had police officers on the incident train. We were getting real-time information for what was going on on the train and in the station, as well.

MR. DOUGHERTY: Thank you. That concludes WMATA's questions, Chairman Hart.

CHAIRMAN HART: Thank you, Mr. Dougherty.

Federal Transit Administration, Mr. Littleton?

MR. LITTLETON: No further questions, sir.

CHAIRMAN HART: Thank you.

Tri-State Oversight Committee, Ms. Baryshev?

MS. BARYSHEV: No further questions. Thank you.

CHAIRMAN HART: And excuse me if I'm pronouncing your

name incorrectly.

MS. BARYSHEV: That's fine.

CHAIRMAN HART: Okay. Thank you.

And do we have any further questions from the D.C. EMS, Mr. Geldart?

MR. GELDART: Yes, sir, just a couple questions, one for Mr. Williams.

Since the event, has the OUC done any coordination with WMATA to enhance the procedures for calls taken from the ROCC, and have we established any training within the OUC working with WMATA to better handle the calls that may come from WMATA?

MR. WILLIAMS: Yeah. So on the first part of your question, since the time of the incident, we've provided WMATA a 10-digit telephone number to contact us. That goes directly to a 911 operator. Since the WMATA ROCC is not located in the District, they simply can't call 911. They have to contact us via a 10-digit number. Once that call reaches our 911 call takers, we've also created a document above and beyond the protocols that they currently use for the call takers to gather pertinent details, including things like the chain marker. And it's a guide to help prod along the interview process to get that extra information from WMATA so we can provide it to the fire department.

As it relates to training, since the incident, we've had several roll call trainings with the D.C. Fire and EMS covering

specific Metro information concerning response, the apparatus that go on those responses, incident command, what occurs on those responses, as well. We've also recently met with WMATA to establish a communications channel. And when I say communications channel, just open up so we will meet with them on a regular basis to discuss information concerning responses, concerning WMATA contacting us with information, and also so our employees understand the -- what WMATA has, what WMATA is dealing with on their side, as well, when they contact us.

MR. GELDART: Thank you, sir.

For Mr. Bodmer, earlier, you answered a question about the scheduling of going out to One Judiciary Square to further investigate the issues that were going on pre-incident with the L'Enfant Plaza area and the radio system that WMATA maintains. You stated that it was scheduled for the 14th to go out there. Mr. Kavaleri earlier testified on the panel that the OUC radio operations are 24/7, so they're there to respond to anything that happens with our radio system 24/7. Is there a reason why it was scheduled for the 14th?

MR. BODMER: I can't answer as to why it was scheduled for the 14th, but when our radio comm. maintenance people needed to get into that facility, that was the date that was given to them.

MR. GELDART: Okay. So just to be clear, that was the date that was given by the OUC to your radio team?

MR. BODMER: The radio people that they were talking to gave them that date to go up there to One Judiciary Square to look at that com room, yes.

MR. GELDART: Okay. That's a little difficult because they're 24/7, so -- okay.

I have no further questions, sir.

CHAIRMAN HART: Okay. Thank you.

The parties have now concluded their questions for Panel No. 2, so it's now time for the Board of Inquiry to begin our questions for the witnesses. Each Board Member will be given 5 minutes, and we'll see after that's over if we have time for a second round.

So let's start with Member Sumwalt.

MEMBER SUMWALT: Chief Hawkins, I want to thank you for the job that you and your team do. Most people run away from burning buildings, whereas your people run into them, and they do that to protect us all, so thank you.

In your testimony, you indicated that D.C. Fire has learned from this event. Could you please, if you haven't already done so, supply a list of those learning points to the NTSB? Has that already been supplied?

MR. HAWKINS: Yes. I submitted a list of initiatives post-L'Enfant Plaza incident concerning training exercises and some of the things we're doing to enhance and improve our relationship with WMATA and the whole system.

MEMBER SUMWALT: Great. Thank you. But of course, that's why we're here. We're here to learn what happened so that we can learn from it and keep it -- and make it better next time.

I do want to refer you to -- and we don't need to pull it up. I want to refer to Exhibit G37, which is the interview transcripts of Mark Olson. Mark Olson was the Metro Transit Police on-scene commander, and then he was -- and we don't need to pull it up -- it's not going to be pulled up, but he was the on-scene commander, and he was attempting to transfer, as you know, to your lead, who was -- it was Battalion Chief Chapman. And I'm going to read out of G37 just page 7. I'm just going to read some of this, and then I'm going to ask you a question about it.

So this is Mark Chapman [sic] from Metro Transit Police. He says:

"I caught up with the vehicle. I had to add that it was pouring rain. I identified myself to the gentleman who was the battalion chief, who was assuming the incident command of the incident. His name was Chapman. I explained that I'm the Metro Transit Police on-scene commander. I said immediately -- the first thing I told him is that we have a train stopped down there with patrons on board and I'm very concerned about self-evacuation. We need to get evacuation of patrons started immediately. He looked over at his driver, and then said something to the effect of, well, I have to get my personnel down there to assess where the smoke is coming from first. And then I

said to him again, well, we have passengers down there on that train and we need to get them evacuated. And he rolled his window up."

So we know it's raining. Let me ask you this. The buggy, which I guess is an SUV; is that correct?

MR. HAWKINS: That's correct.

MEMBER SUMWALT: Yeah, what is it? Like a Tahoe or a Suburban or something like that?

MR. HAWKINS: That's correct.

MEMBER SUMWALT: Is there any equipment or any reason why the -- why this person that I'm referring to could not have gotten into the back of the vehicle? Because it's pouring down rain. Could he have gotten in the back?

MR. HAWKINS: You know, the battalion chief carries a lot of equipment, but if he want -- he could have got in the back. It's a matter of just moving equipment around.

MEMBER SUMWALT: Okay. That's --

MR. HAWKINS: There should have been a seat back there.

MEMBER SUMWALT: Okay. I did not know if it would be full of electronic gear and things like that. Okay. So I'm going to -- so let me ask you this. In the previous round of questions, the topic of you mentioned joint survivor -- excuse me -- joint supervisory training. And I'll ask this to Chief Hawkins as well as Mr. Bodmer or Ballard. This joint supervisory training was started years ago, but then, apparently, it ceased; is that

correct?

MR. BODMER: That's correct, sir.

MEMBER SUMWALT: And Chief, so do you know why it's -- why was it started and then why did it stop?

MR. HAWKINS: Well, it was started to improve our relationship roles and responsibilities on a Metro incident. You know, a Metro incident is a multi-agency problem with the jurisdictions. So we started to train to improve, you know, that process.

MEMBER SUMWALT: And why did it stop? Anybody know? Mr. Ballard, do you know, or Mr. Bodmer?

MR. BODMER: Yeah, on the Metro end of it, we went through a series of different trainings. We started a training, I guess, a course called Managing Metro Emergencies. We then went into a training block called Metro Emergency Response Training. And now we're back to the JST.

MEMBER SUMWALT: Now, why did it stop?

MR. BODMER: I think in the managing Metro emergencies training that we did, the jurisdictional fire departments were invited to that training, and it was very similar to the JST training. And then we got away from the JST, and we went to the MERT training, which is the Metro Emergency Response Training, but that was primarily for WMATA staff.

MEMBER SUMWALT: Thanks.

Chief Hawkins, do you have anything to add to that, why

it might have stopped?

MR. HAWKINS: Well, I'd like to add that over the course of -- from 2009 to 2014, D.C. Fire and EMS sent 752 firefighters to training with WMATA, various components of training, so we did do training. Some years, it wasn't as much as we would like, but we have done things post-event that we're trying to increase the level of training.

MEMBER SUMWALT: Okay. Thanks. I'm out of time. Thanks.

CHAIRMAN HART: Thank you, Member Sumwalt.

Member Weener?

MEMBER WEENER: Thank you.

Mr. Bodmer, you talked about NIMS, National Incident Management System. Is that a means to standardize the emergency response?

MR. BODMER: Yes, sir.

MEMBER WEENER: And it's intended to identify the chain of command?

MR. BODMER: It's a National Incident Management System that's trying to bring the federal, state and local jurisdictions together in a common operating picture while managing incidents. ICS, the incident command structure, is part of NIMS. And that's the part where it identifies who's in charge of the incident, what the incident commander is, the structure of how the command is set up.

MEMBER WEENER: Okay. Then the reason they -- we had some discussion about the agreements between the Council of Government members, and that's to put those kinds of agreements in place; is that correct?

MR. BODMER: The NIMS, the Council of Governments Fire Agreement with the jurisdictions follows the NIMS format and uses ICS, yes, sir.

MEMBER WEENER: Now, how many jurisdictions does WMATA have to interact with in an emergency situation, potentially?

MR. BODMER: I believe we cover the entire COG region for the Metro side of it. Certainly, it's Montgomery and Prince George's County at the Maryland end, the District of Columbia. We have in Virginia, Arlington, Fairfax, Alexandria. We have the Metropolitan Washington Airport Authority, and we're moving into Loudon County.

MEMBER WEENER: Do you have the same kind of agreements with each of those jurisdictions?

MR. BODMER: Yeah, the agreement -- it's a COG agreement, so all those jurisdictions have signed off on that agreement.

MEMBER WEENER: And are the operating processes and procedures, then, identical for all of those areas?

MR. BODMER: That's correct, sir. Now, in the different jurisdictions, they may have their own protocols for operating on Metro incidents. Specifically, Northern Virginia has what they

call a Northern Virginia manual which all of the Virginia agencies follow, Alexandria, Arlington and Fairfax. I think the District of Columbia has their own independent SOP for Metro incidents, as well as does Montgomery County and Prince George's County.

MEMBER WEENER: Now, those SOPs are for the jurisdiction to operate within themselves? The interface between WMATA and the jurisdictions should be the same or not?

MR. BODMER: The COG agreement gives the basis for the basic operating structure of the Metro incidents, yes, and who does what. Definitions are all the same. Everybody follows that agreement, yes, sir.

MEMBER WEENER: Okay. And Chief Hawkins mentioned that you've got common training programs between D.C. and WMATA for these kinds of activities?

MR. BODMER: Yes, sir. In WMATA, the Office of Emergency Management is responsible for all training involved in the fire and rescue jurisdictions in the region. And we put on training throughout the years. The Passenger Rail Safety Subcommittee, which is the subcommittee of the Fire Chiefs Committee, we are -- attend those meetings. We offer up training. Throughout the year, the jurisdictions, based on their training calendar, will select when they can train, and we train them.

MEMBER WEENER: Now, you also mentioned that you had tabletop exercises. When is the last full-scale drill, emergency drill, that you have done with any one of the constituents of the

COG?

MR. BODMER: If I could give you a little history on some of the exercises that we've done in the past, in 2005, for the District of Columbia, we did Operation Deep Rescue, which was a train that was stuck on the Potomac River between Foggy Bottom and Rosslyn.

In 2007, we worked with the District of Columbia and Arlington County on Operation Troubled Waters, which was on the L line bridge, the L line bridge that crosses the Potomac River.

And in 2011, or 2010, I should say, we did three exercises. The first one was up in -- between the District of Columbia and Montgomery County. It involved an active shooter at our Friendship Heights Metro Station. We did another exercise in March of 2010 at -- between, again, Foggy Bottom and Rosslyn, which simulated a rail explosion in the middle of the river. Arlington County and D.C. and the FBI were involved in that. And then we did bus IED exercise with D.C. Fire and D.C. police, FBI, at the RFK stadium.

In 2012, we did a Clarendon single-track exercise, and this was an exercise that was done after an incident that we had at the Clarendon Metro, where a person was struck by a train. A subsequent fall out of that exercise revealed almost a mass casualty incident at the Roslyn Metro Station, where it was evening rush hour -- I think it was about 5:00 in the evening. We had all the local businesses, people were getting off work, and we

weren't moving people through that station because it was a side platform station, similar to the way L'Enfant Plaza is set up. So we met up with Arlington County, says let's see if we can do a single-track while we're doing a rescue, a rescue of a person that may have been struck, and it's still not a recovery but a rescue operation. And we did do that, and we successfully did that.

We did an exercise with the FBI at the Navy Yard Station called Marvel Challenge. And that dealt with an improvised explosive device. And we worked with the FBI, the D.C. Fire, I think, had a little bit of play in that one.

We've done numerous winter weather drills. We've done evacuation exercises, getting ready for the opening of the first phase at the silver line, we did two full-scale exercises. We did three tabletop exercises on that prior to going revenue. Our goal was originally to do, for Fairfax County, since they didn't have any tunnel segments, we wanted to do a full-scale of the tunnel, that little tunnel out there by Tyson's Corner. We wanted to do an aerial exercise because a lot of that rail out there is up in the air. And then we want to do an active shooter exercise. So the two full-scale was the active shooter and the aerial exercise, and we did a table top on the tunnel exercise on that one.

MEMBER WEENER: That's fine. I think I'm running out of time here.

MR. BODMER: Yeah, and just, if I could, this year, we've already done one exercise with Prince George's County, the

Greenbelt Metro in April. The next one is scheduled for Stadium Armory for the District of Columbia. That'll be August 23rd, full-scale.

CHAIRMAN HART: Thank you, Member Weener.

Vice Chairman Dinh-Zarr?

VICE CHAIRMAN DINH-ZARR: Thank you, Chairman.

My first question is also to Mr. Bodmer, what I hope is a fairly simple question. The smoke alarm that triggered at 3:05, where did it alert? And what happens when any alarm is triggered in that manner?

MR. BODMER: I'll defer that to Mr. Ballard.

MR. BALLARD: The alarm that triggered at 3:05, that alarm was not received in the Operations Control Center. So I am not sure where that alarm went. It was not until, as I mentioned earlier, at 3:20 and 59 seconds that OCC received a fire alarm in the control center. So the earlier alarm, and I was told that it was in the vent shaft, was not received at OCC.

VICE CHAIRMAN DINH-ZARR: It was not received there? And Mr. Bodmer, you don't know where the alarm was received elsewhere within the system?

MR. BODMER: The alarms report directly into the Rail OCC, and not only the assistant superintendent monitors these alarms, but also, I believe Mr. Ballard at MOC monitors these alarms, as well.

VICE CHAIRMAN DINH-ZARR: But I think Mr. Ballard is

saying it wasn't received; is that correct?

MR. BALLARD: That's correct. It was not received in the Rail Operations Control Center on their computer system in Rail OCC.

VICE CHAIRMAN DINH-ZARR: So we don't know where this alarm, this first alarm was received at all?

MR. BALLARD: What we do know is that it was not received in OCC. I'm not sure where it was routed to.

MR. BODMER: Yes. We know that the alarm did activate, but it was not received in the Rail OCC.

VICE CHAIRMAN DINH-ZARR: Is it possible to find out where that alarm was received and why didn't it get received?

MR. BODMER: Yes, ma'am.

VICE CHAIRMAN DINH-ZARR: Thank you.

I don't know if that's --

DR. POLAND: Yes. Could you please provide us some sort of written documentation of where that alarm alarmed to, and we will enter it into the docket as an exhibit?

MR. BODMER: Yes, ma'am.

DR. POLAND: Thank you.

VICE CHAIRMAN DINH-ZARR: Thank you. And I know all of you have very difficult jobs and it's a complex system, so I appreciate your checking that out. I think it's an important question.

So reading all of the interviews, I felt that there were

a lot of different types of responses and different personalities. And I know that it takes a very calm personality to react to some of these stressful situations. So my question is, for the controller, because this is a very infrequent occurrence, could you walk us through the selection process for the people you have as controllers? And then I have a follow-up question about the training as well.

MR. BALLARD: The selection process for a controller is -- in the early days, it was primarily the persons who were former train operators who were supervisors. Then in the early 2000s, we also added to that individuals who were interlocking operators. Interlocking operators are persons who carry out the same type of responsibilities in our rail yard as OCC does with the management of trains on main line. Interlocking operators are responsible for the management of the rail yard, the movement of trains in the rail yards. So after, later, maybe around 2005, we received our first person who was not from a transit background. It was an air traffic control person, a military air traffic control person. Prior to that, we received some applicants from other transit agencies, but they had a transit background. But we received our first military air traffic control person.

So, basically, the personnel who are selected in the control center have prior transit experience, primarily in Metro, sometimes with other transit agencies. And now we are adding to that persons who have military experience in air traffic control

center environment, which is similar to Rail OCC.

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Ballard. So they have different backgrounds in, or different experiences with emergencies. In the 26-week training, are there aspects that are specific to emergency situations or simulations that are -- and triaging, such as prioritizing emergency, multiple emergency situations that they're given during their training?

MR. BALLARD: Yes. During this 26-week training, it involves going over all of the procedures, getting an understanding of how to apply what's being outlined in the procedure. There's a step-by-step process of what should be done in each type of situation identified in the various procedures for the train operator, for the OCC. Also, the control center staff who are doing the training, they are brought into the control center, and they work alongside of an experienced controller, getting experience on managing incidents, getting an understanding on how to operate under the conditions that are prevalent within the rail control center during emergency-type situations.

And so, also, during their training, the controllers are taught how to develop strategies on how to address the various types of situations that occur. What we do, even after the controllers have completed their training, they've been certified as a controller, we put them with a more experienced controller to make sure that the controller, if there is a situation where the controller needs some assistance or have questions, may not have

the level of familiarity that an experienced controller would have, that there is a controller sitting beside that person to provide any assistance. Also, in the control center itself, there is an assistant superintendent. So there is never a point where a controller is in the control center without the assistance of a second controller or a manager to provide any necessary assistance that the controller may feel that he or she may need to be able to address a specific incident.

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Ballard.

Sorry, Chairman, for taking over my time.

CHAIRMAN HART: Not to worry. Thank you for the question. Given that Mr. Bodmer said that the alarm, smoke alarm was supposed to show up in the control room and Mr. Ballard is saying it didn't, have you guys or our guys found out yet why it did not alarm in the control center, control room?

MR. BALLARD: I don't have that information available to me. One of the maintenance groups may have been researching the issue, and that information may be available within the maintenance groups, but I don't have that information.

CHAIRMAN HART: Okay. Well, I'm assuming our investigators are going to be looking into that.

MR. BALLARD: Yes, sir.

CHAIRMAN HART: Let me go to the reversal of Train 302 and just ask you to walk me through the process of reversing a train in terms of what the operator does, what somebody does in

the control room, what anybody else does if there is any need for any -- just walk me through the process of how that occurs, how you can move a train backwards.

MR. BALLARD: Yes, sir. Unlike some other systems, each one of our rail cars are operating cars. So the operator -- if the operator becomes aware of a situation or if the train itself is not able to move from the operating car, the operator communicates with OCC. They begin their necessary troubleshooting trying to get the train moved in the same direction if there's a train -- as in the January 12th incident, it was something that was ahead of the train that prevented the train from being able to move forward in the same direction. So the Operation Control Center directed the operator to go to the opposite end of the train, which is another operating car, and move the train back to L'Enfant Plaza.

CHAIRMAN HART: So that's when you turn off the key, walk through the train, put the key in at the other end, and turn the key back on?

MR. BALLARD: Yes, sir.

CHAIRMAN HART: Okay. And then what's the next step?

MR. BALLARD: The next step is then the operator gets permission from OCC to move the train back to the station platform.

CHAIRMAN HART: And what happens to the track alignment in the meantime? What has to happen with respect to the track

alignment?

MR. BALLARD: When the train left L'Enfant Plaza, OCC can manipulate the switches to align the route for the train to leave L'Enfant Plaza and go towards Pentagon or go towards Branch Avenue. On this particular day, after the train left L'Enfant Plaza, I'm not sure what position the switches were laying in after the train left, but even if they were not laying in the same position as the switches were laying in when the train left L'Enfant Plaza, OCC has the ability to manipulate the switches from Landover to align a route for the train to reenter the station. Because the train was there and the train had moved away from the interlocking itself, the train was going in the opposite direction, the controller had to give the operator permission to move a portion of the distance without a speed command.

CHAIRMAN HART: I've heard some reference to a process called clamping the track. What is that all about?

MR. BALLARD: In this situation, and I'm doing this based on my experience being a controller in the control center.

CHAIRMAN HART: Yes, please, and I'm not asking you to speculate or give opinion on something you're not sure of. I'd like to know if you're factually aware of it, but if not, please let us know that.

MR. BALLARD: Oh, yes, sir, I'm aware. The only time that we have to clamp switches is if there is a situation where OCC cannot control the switches. OCC cannot control the signaling

at the interlocking itself. In this situation, there was no problem with the interlocking itself, so OCC had the ability to manipulate the switches to align the rail for the train to come back into the platform.

And what I would have done, what OCC would have done, is they would have set a route as if there was a train on the platform in L'Enfant Plaza going towards the Pentagon. The Train 302 would not have seen a green light signal or lunar signal, but with authorization from OCC, because the tracks were aligned properly, the switches were locked into position and there was no possibility that the switches could move, OCC had the level of certainty that it was safe for that train to move back across the switches. So OCC would then give the operator permission to move the train at a reduced speed back to the platform at L'Enfant Plaza.

CHAIRMAN HART: So with Train 510 there, how much could 302 have gone onto the platform to have cars that people could exit from onto the platform?

MR. BALLARD: Based on the post-incident investigation, it was revealed that there was space of about two cars left on the platform at L'Enfant Plaza. So 302 would have been able to move two of the six cars onto the platform at L'Enfant Plaza and have the customers to exit those two cars.

CHAIRMAN HART: Okay. So just one more question because my time is up, but where in this time frame of operator moving

from one end to the other, and all that, was it ascertained that there was not enough power to move the train? Is there any knowledge -- do we have a timeline of that? I'm not asking you to guess or speculate, but do we have a timeline regarding that?

MR. BALLARD: No, sir. It was not until the post-incident investigation that we determined that there was not the necessary voltage there available. Throughout the incident, OCC was operating under the assumption that the train, Train 302, had the necessary power, voltage being supplied to the third rail to allow it to move back to the platform.

CHAIRMAN HART: Okay. Thank you. My time is up.

Member Sumwalt?

MEMBER SUMWALT: Thank you. So we're talking about coordination. And I really think there are three lines of coordination. There is the on-scene coordination. There is the coordination within OCC. And then there is the coordination between OCC and those who are on the scene.

So with respect to the on-scene coordination, the words that Mark Olson stated, his words from his interview, he said -- the words he used were "dysfunctionality." He's referring to his communications with the D.C. Fire incident person who was supposed to assume the incident command. He said he felt ignored. So we've talked about that. That's in Exhibit G37. Within OCC, in Exhibit B5, somebody said that the left hand didn't know what the right hand was doing. There was yelling within the OCC. And

somebody said that we lost control of the railroad. And then between the OCC and the on-scene, I want to know who the heck is in charge. We've got Exhibit G31, where this is a person who is in the OCC, and he's saying that the incident commander is telling them that they need to put the fans in supply. He's questioning that. So they have to get on the phone to call and reaffirm it.

So you've got people that are in OCC that are having to rely on people that are on the scene. I'm wondering who is in charge in an emergency situation. Is it Metro Transit Police? Is it the OCC? Is it the fire department?

The people in the field have no authority to move the trains unless they coordinate with OCC. They have no authority to close a station. The train operator has got to receive permission to turn off the train air intake, the station air intake, or the train air intake without the OCC permission? There's a lot of people that have to -- there's a very centralized form of management. The people in the field aren't authorized to make decisions. So -- but the people that are in the responsibility of having to make the decisions aren't in a position of having complete knowledge of the situation.

So I'd like to ask both of the gentlemen from WMATA to comment on that, if you will, please.

MR. BODMER: Yes, sir. Any incident involving the response of fire jurisdictional personnel to a Metro incident, the fire department is in charge of that incident. And that's through

the COG agreement. They are in charge of that.

MEMBER SUMWALT: Okay. And I understand that. That's in the emergency situation after they get there, but how about things like, as I understand it, there was smoke that was coming into the cars. And in order to shut off the ventilation system air intake for the cars, train cars, that operator of that train had to request permission from OCC; is that correct?

MR. BALLARD: No, sir, that's not correct. The procedure states that OCC would instruct the operator to turn off the EV. Our procedures also say -- there is nothing in the procedure that specifically prohibits the operators from taking action him or herself to turn off the EV. We know from our post-incident investigation that the environmental, the ventilation was disabled when the train came to a stop at that point in the tunnel between L'Enfant Plaza and the portal. Our procedures also say that in the absence of any specific instruction, that Metro staff is supposed to -- they're obligated to take the wisest and the safest course of action.

What we've done post-incident, we've gone and clarified just in case there are other individuals who may have interpreted our SOPs to have an understanding that there's something in there that prohibits them from taking action, our new procedure states -- it specifically gives the train operator authorization. So if there are other train operators who are in a similar situation in the future, it's been clarified for them that they have

permission, they have the authority to disable the environmental when it becomes necessary.

MEMBER SUMWALT: Okay.

MR. BODMER: If I could add on that, when we get a call where the jurisdictional fire department responds, we send two police officials to the scene, one to the incident command post, one to act as a forward liaison. We also send a police official to the Rail OCC to act as the OCC liaison to the on-scene commander that is -- at the incident scene. We also, Rail also assigns rail transportation supervisors to go to the scene, as well, two just like the transit police, one to the command post and one to the forward liaison position, as well.

MEMBER SUMWALT: Okay. Thanks. My time is up, but okay, thanks. I was just looking for the testimony of the train operator, but I think that particular train operator of 302 felt that he could not deactivate the ventilation air intake system until he received permission from OCC; is that correct?

MR. BALLARD: I don't know.

MEMBER SUMWALT: I can find it if you don't know, but --

MR. BALLARD: Yes, sir.

MEMBER SUMWALT: That's okay. Thank you very much.

CHAIRMAN HART: Thank you, Member Sumwalt.

Member Weener?

MEMBER WEENER: Yeah. To follow on the questions asked

by the Chairman, the post-accident review[3] indicated that the train could not be moved because there wasn't sufficient power. But that wasn't known until the post-incident review; is that correct?

MR. BALLARD: Yes, sir. That is correct. Because of the indications that were received in the Rail Operations Control Center, the indication seen by controllers was an indication to them that third rail power was being still supplied, the appropriate voltages were still being supplied to the Train 302.

MEMBER WEENER: So as far as the train operator knew, he could have moved the train? He didn't -- he would have found out when he tried that he couldn't move it; is that correct?

MR. BALLARD: Yes, sir. The train operator would have determined that the train would not be able to move once he made the attempt to move it. The train operator, based on his action, didn't know the cause, the reason why the train was not able to move. The train operator just became aware when he attempted to move the train that the train was not able to move.

MEMBER WEENER: So as far as everybody knew, the train could be moved, so why -- who had the authority or whose authority was missing, in terms of actually moving, trying to move the train?

[3] WMATA provided a correction to Mr. Ballard's testimony. WMATA stated that they did not develop an after action report, after action review, or a risk assessment. Initial discussion in the transcript concerning the post-incident investigation occurs on page 167.

MR. BALLARD: Sir, from the onset, when OCC initially got the report that the train could not go any further in that direction, the operator was told to go to the opposite end, the L'Enfant Plaza end of the train. And the operator, you know, followed OCC's instructions, and the operator made the attempt to move the train. After the operator made the attempt to move the train, the operator became aware that the train was not able to move. Then the operator and OCC went through a series of troubleshooting the trains, the train, and it was not until, like I said before, post-incident investigation that we got a clear understanding as to why the train was not able to move.

MEMBER WEENER: Okay. So there were actually attempts to move the train backwards?

MR. BALLARD: Yes, sir.

MEMBER WEENER: Okay. Just a follow-up on a couple of quick questions related to what I was questioning you about earlier with Mr. Bodmer regarding you obviously did a post-incident review, and we just talked about that, for the January 12th. But for the exercises that you've done between WMATA and other members of the Council of Governments, do you do an after-action review with all of those, as well?

MR. BODMER: We do. After all the full-scale exercises, we will do a hot wash. Then we'll prepare an after-action report.

MEMBER WEENER: And what happens to these reports?

MR. BODMER: The reports are filed with the Office of

Emergency Management at WMATA. If there's any issues, they're brought up with the appropriate parties, whether it be within WMATA or any issues that may come up with the fire jurisdictions.

I will tell you on one of the silver line exercises, the aerial exercise, we found out that our ladders were not long enough to reach the track bed because of the way that construction was done out there. So we immediately had our engineers develop a kind of a platform that would be put on the trains, that would fit under the ladders so they would make contact with the roadway out on that section of the line. And we didn't know that prior to that exercise.

MEMBER WEENER: All right. Thank you. Yield my time.

CHAIRMAN HART: Thank you, Member Weener.

Vice Chairman Dinh-Zarr?

VICE CHAIRMAN DINH-ZARR: Thank you, Chairman.

Mr. Ballard, just to follow up on Member Weener's question, so are you saying that the operator tried to move the train but was unable to do so, so he actually attempted it and then realized he couldn't do it?

MR. BALLARD: Yes, ma'am. What happened is that when the train operator went to the opposite end of the train, that being the L'Enfant Plaza end of the train, the operator turned the train on, attempted to get the train to move, the train did not move. The operator went through his troubleshooting procedures, techniques, contacted OCC, alerted OCC that the train was not able

to move. OCC went through their normal troubleshooting techniques, questions to the operator as to what indication the operator was seeing on the train that prevented it from being able to move. And then the OCC, based on the information that the operator relayed to OCC, then the OCC staff instructed the operator to go to -- through the train to try to identify whether or not there was a specific car within the consist that prevented the train from moving. The operator identified two cars. The operator released the brakes in those two cars because there were indications on those cars that there was a problem. The operator returned to the operating car, expecting that the train would be able to move, got to the operating car, being the L'Enfant Plaza end of the train, and again attempted to move the train, and the train was not able to move under its own power.

VICE CHAIRMAN DINH-ZARR: Thank you.

MR. BALLARD: Yes, ma'am.

VICE CHAIRMAN DINH-ZARR: So I'd like to ask a question about the evacuation, but of course, I want to do it with the greatest respect for the passengers and families. So from the interviews, I understand that one unconscious passenger was carried out by a firefighter. But in getting a tour of WMATA, I saw that there were the emergency tunnel evacuation carts, the ETECs, I think they're known as. So could you explain either Chief Hawkins or Mr. Bodmer if the ETECs were used -- or I mean, in this situation, it wasn't because in the interview, it said

that the firefighter actually had to carry this passenger who was unconscious out. So were they not available? Was it too difficult? What were the reasons if they weren't used, and were they used later for other passenger?

MR. BODMER: On that particular incident, the ETECs were used. We had one passenger that was in a wheelchair, and they used the ETEC to bring that passenger out, I believe.

MR. HAWKINS: That's correct, ma'am. And to add to that, the first arriving unit to the train was Rescue Squad 1. The person at Rescue Squad 1 removed the unconscious victim, and when the remaining part of the fire department and recon group arrived, they started using ETEC carts.

VICE CHAIRMAN DINH-ZARR: And were they not available at that time, or they -- I mean, what was the reason behind not using it? I assume it would be easier to use it than to carry someone?

MR. HAWKINS: Yes. Initial response was people in the train trouble breathing. Rescue Squad 1 wanted to make to the train to do a quick assessment. And as more personnel, manpower got to the scene, we went and got the ETEC carts.

VICE CHAIRMAN DINH-ZARR: Okay. Thank you. I think I have time for one quick question.

So Mr. Bodmer -- I mean, sorry -- Mr. Ballard, could you explain when there is an emergency, does the controller continue managing all of the other trains that are within his or her purview or how does that work? I mean, you know, does someone

come to relieve that person?

MR. BALLARD: In the control center, when there is an incident, unlike some other transit agencies, we have two persons at each console to manage the lines controlled by that console. What happens is when there's an incident, then the decision is made by the controllers on how to respond to that.

DR. POLAND: Mr. Ballard, could you pull your microphone closer again?

MR. BALLARD: Yes, I'm sorry.

DR. POLAND: Thank you.

MR. BALLARD: When there's an incident, the controllers make a decision. They decide on the strategy that they're going to use, along sometimes with the assistant superintendent, that they're going to use to try to mitigate the impact of the incident on the rest of the system. So the controllers, as they're called controllers, they control the situation, they control the lines, they control the movement of the train, they control the signaling, they control the ventilation, they control the third-rail power. They're in direct communication with anyone, everyone working on that particular line.

So during an incident, when I was a controller, one of the first things we did is we made a blanket announcement to all of the individuals on that radio frequency letting them know that we have an emergency, and unless you, that person, those individuals have an emergency, that they were supposed to clear

the radio frequency. Also, we have the ability, because we -- communication to hold trains at station platforms, just to stop all train movement until we feel that we have the situation under control. What we know in most incidents is that the first few minutes, you can get the incident under control, and then decisions are made on how you're going to mitigate.

Sometimes a technique that is used is we reduce the number of trains on the rail system itself. If the controllers feel that they've got too many trains for them to manage, they offload trains, they send them back to the yard and increase the frequency, the headway of trains so the controllers have the ability to manage the line at a level that they're comfortable with.

VICE CHAIRMAN DINH-ZARR: Thank you, Mr. Ballard.

CHAIRMAN HART: Thank you, Vice Chairman Dinh-Zarr.

I'd like to -- we heard some conversation about training of the controllers to -- regarding the operation of the ventilation fans. So if we had this problem today, and here's the train, and here's the source of smoke, and there's a fan on that side and there's a fan on this side, would a controller today have the information they would need to know, to know what to do with the fans and which one to put on exhaust and which one to put on supply, and just -- in other words, would they -- is there a way for them to have the big picture to know what to do with the fans?

MR. BALLARD: Yes, sir.

CHAIRMAN HART: And how would that occur?

MR. BALLARD: Yes, sir. After the incident on January the 12th, we had what we call a stand down, a safety stand down. The managers in OCC, along with myself, we devised a flowchart, a training tool, to provide to all of the OCC assistant superintendents, the controllers. Each controller was brought into a training room. They were given this material. They were instructed on how to configure the fans based on specific scenarios.

So as it was stated at an earlier panel, there was an RFP out to have a contractor come in to give us some additional information on how to configure fans, but -- and to get ahead of that to make sure that all of the staff is adequately trained to handle similar type incidents as January the 12th. We didn't want to wait until, you know, we get the product that's going to be provided to us in the future. So I am confident that, based on the information and material that we've provided, and I will provide that -- I think it's been requested -- to the NTSB. And it talks about, you know, trains at stations, trains in the tunnel, station incidents, incidents in the tunnel without trains being present.

CHAIRMAN HART: So did you say we have seen that protocol; that's part of the docket?

MR. BALLARD: I think it's been requested. I'm not sure if you have it, but if you do not have it, I will provide it.

CHAIRMAN HART: Okay. Another question about smoke and moving trains towards smoke, I'd like to get a timeline on when was the smoke known about versus when the -- when 510 came into the station southbound into that smoke and when this northbound train came into that station, given that smoke. What do we know about the timelines regarding those relative events?

MR. BALLARD: The report from Train 302 came to OCC at 3:15. About 8 minutes later, Train 510 was riding into the platform at L'Enfant Plaza. And like I said earlier, the reason for that was that because OCC became aware that the problem, in their estimation, the problem was somewhat isolated to the tunnel outside of L'Enfant Plaza, going towards the portal, headed towards the Pentagon, that it's a a separate tunnel, and that they would be able to bring Train 510 into the platform at L'Enfant Plaza, not service the station, and continuing towards Branch Avenue.

CHAIRMAN HART: So did the report of smoke in the L'Enfant Plaza Station come before or after those two trains, one from the north and one from the south entered the station? Do we have a timeline on that? I'm not asking you to speculate. I just wanted to know if we have a timeline.

MR. BALLARD: Yes. The report of smoke in the station at L'Enfant Plaza came in at advance, but the report was nonspecific. And in OCC's estimation, the smoke incident was at the portal and -- at L'Enfant Plaza portal, in the portal going

towards the Pentagon.

CHAIRMAN HART: Okay. So it -- okay, well, then I'll just have to take a look at the timeline and see when that smoke report was received in the control room versus when those two trains were dispatched from the previous station to enter into the L'Enfant part of the station.

MR. BALLARD: Yes, sir, because we got the report from the train operator, and the train operator reported -- the train operator with 302 is located in the tunnel.

CHAIRMAN HART: Right.

MR. BALLARD: And so OCC -- and I'm -- I was not there.

CHAIRMAN HART: Yeah, that's why I'm asking about the report of smoke in the station when they had the order to use the exhaust fans to take the smoke out of the station. That's the report I'm talking about.

MR. BALLARD: Right, yes, sir.

CHAIRMAN HART: So I'll see that timeline when -- are we gathering -- are investigators gathering that timeline? I assume we are?

(No audible response.)

CHAIRMAN HART: Okay. Great.

My time is almost up, but one more question about the human chain and the talk-around. Explain to me what that's all about. I didn't understand how that worked.

MR. HAWKINS: Yes, sir, you're referring to the talk-

around channel?

CHAIRMAN HART: Yes.

MR. HAWKINS: Okay. Yeah. So we have communication procedures that we use the 800 megahertz first, and if we start to experience a problem, we would switch over to a vehicle repeater system. And if we start experience a problem there, we would use the talk-around channel. And what the talk-around channel is, is it's a separate zone of channels that we use to give us line of sight communications, pretty much forming a human chain. You have three firefighters in a row, the signal can transfer between portable radios.

CHAIRMAN HART: And they would literally have to be line of sight? That's why you call it that?

MR. HAWKINS: Yes, sir.

CHAIRMAN HART: I see. Okay. Okay. My time is up.

Do any other members have any, before we move back to the tech panel, any other members?

Member Sumwalt?

MEMBER SUMWALT: Thanks. I'd like to clarify something, Mr. Chairman. My last line of questioning was whether or not the operator of a train felt that he had permission, had to ask permission to move the train. And in fact, on Exhibit G15, page 45 of that, in that interview, the train operator, operator of 302, said that he was asking the ROCC for permission to move the train back, but he never got that permission. And also, on G15,

page 10, OCC kept telling the operator to standby, standby, standby, we need to clear the platform. So this operator, according to his witness -- according to his interview conducted after the accident, he did feel that he needed that permission.

But I want to move on. To Mr. Bodmer, Mr. Ballard, what would you say are the biggest threats to WMATA rail, Metrorail? I suspect, you know, train to train collisions may be one of them, active shooters, smoke/fire. Where does smoke/fire fit into the rank ordering of your threats?

MR. BODMER: I would just be speculating, sir, on that, I would think.

MEMBER SUMWALT: Is it -- and I don't want you to speculate, but Mr. Ballard, do you have any information on that?

MR. BALLARD: It would be very difficult for me to sit here and determine what would be the most critical incident and compare smoke as opposed to some other incident that may occur in the system and the severity --

MEMBER SUMWALT: That's okay. But -- and I realize that threats or hazards, you assess the risk associated with those hazards and then you mitigate those hazards and bring them to as low as is reasonably practicable. And so you do that by various things. For smoke/fire, we've got engineering and environmental solutions like ventilation systems and fire alarms, maybe even fire suppressions systems, in some cases. But on the human side, we've talked about the training. That's one way you mitigate

risk. But another way would be through standard operating procedures. So at the time of the -- at the time of this accident, what SOPs did you have specifically in the OCC regarding smoke or fire in a tunnel?

MR. BALLARD: SOP 6. It talks about fire in a tunnel, on the roadway. SOP 6 talks about fire on the roadway. So OCC was operating under that procedure. And what we're trained to -- in the Rail Operations Control Center is always assume the worst case scenario. And until we have determined the severity of the incident, we operate as if it's a major incident. So --

MEMBER SUMWALT: No -- thank you. So how -- was that procedure referred to during this event, and is it a big, long textual thing or is it a checklist? I was an airline pilot for a long time. I had my quick reference handbook. It was literally right next to each pilot. It was right there. If I had a smoke or fire, I'd pull it out there and go to tab 42, and it would tell me step by step what to do. Cabin fans on. Evac fans off. You know, whatever it says. Cabin fans, lower extract fan. Did you have a step by step procedure, or was it some long, bureaucratic thing that somebody had to read and understand in the panic of the situation, the heat of the battle?

MR. BALLARD: We have checklists available to the controllers. The controllers are trained, tested on the procedures annually to make sure that they are aware of their responsibility based on the situation. As I said earlier, the

controllers don't always refer to the checklist that's available. And going forward, what we've required, we've gone and reviewed those checklists, and we are preparing, making sure that we have a checklist for all of the various situations that can occur that correspond to our SOPs. And we're making sure that the controllers use those checklists. In fact, it is going to be a part of the incident report after the incident has concluded to make sure that the assistant superintendent checks and makes sure that the list has been exhausted.

MEMBER SUMWALT: Yeah, but that's after the accident, and that's good. We want to learn from these things. But was the SOP checklist referred to during this emergency in the OCC?

MR. BALLARD: I was not in the OCC. All of the controllers have the SOP. There is a checklist. But I don't know today whether or not there was actually anyone, whether the controllers, the assistant superintendent, superintendent, or the director reviewed, looked at the SOP or checklist.

MEMBER SUMWALT: Is it your procedure that you would refer to the checklist in something like this?

MR. BALLARD: It's not a hard, fast procedure. It's a tool that's been made available to the staff to use.

MEMBER SUMWALT: Thank you very much.

MR. BALLARD: But it's not a hard, fast procedure --

MEMBER SUMWALT: Thank you.

CHAIRMAN HART: Thank you, Member Weener, do you have

any further questions? Vice Chairman Dinh-Zarr?

VICE CHAIRMAN DINH-ZARR: Thank you, Chairman, just one question.

Mr. Ballard and Mr. Bodmer, when it became clear that it was extremely busy and there was a potential for an emergency situation, why wasn't there a command that all trains were stopped until things were figured out?

MR. BALLARD: Again, I was not in the control center, so the decisions that were made in real-time during the incident, the staff in OCC at the time, I guess they made an assessment of what they had. And based on that assessment, I guess it was determined that they were capable of continuing to manage the movement of the trains on the line. It was 3:00. It was near the beginning of rush hour. So we don't have as many trains on the mainline at that time of day. So the headway that the trains were operating on during that time period may not have posed such a challenge for the controllers that they did not feel that they had the ability -- or they needed to reduce the number of trains, the frequency of trains on the mainline. So that was a decision that was made based on the staff in the control center making an assessment of what they could or could not handle.

VICE CHAIRMAN DINH-ZARR: And usual protocol is to stop the train or it's always up to the staff members on duty at the time?

MR. BALLARD: It's up to the staff members, because I

mean, there are different times of the day where we have different amounts -- number of trains in the system. It depends on the location of the incident. So it's a real-time decision based on what the managers, the controllers feel that they need to do at that particular time. So it varies based on the incident itself.

VICE CHAIRMAN DINH-ZARR: Thank you.

No more questions.

CHAIRMAN HART: Thank you, Vice Chairman Dinh-Zarr.

We'll take the remainder of our time and return to the tech panel, Dr. Poland, if the panel has any further questions.

DR. POLAND: Thank you, Chairman Hart. The tech panel does have further questions, so I'll refer the questions to Mr. Blackistone.

MR. BLACKISTONE: And I'll first pass the microphone to Mr. Bucher.

MR. BUCHER: Thank you, Steve.

My first follow-up question for Mr. Ballard, and it refers to the event recorder on the 302 train. And several of the times of the event recorder, they confirmed what we've already discussed, that the train stopped at 3:15, the operator keyed down from the leading end of the 302 train at 3:16, and at 3:18, he re-keyed up on the rear end of the train in preparation to return to L'Enfant Plaza. At 3:18, according to the event recorder, he had all of his systems were in operation on the 302 train and that the first time that he ran into problems with any of the systems was

at 3:32 when the brake pressure reduced to a point where he could not operate back.

And I guess you've already addressed briefly that there was somewhat of a power loss in that time, but the event recorder does not record any of that. Could you elaborate on that time between 3:18 and 3:32?

MR. BALLARD: Yes, sir. Yes, sir. Post-incident investigation revealed that the train operator reversed ends onto the L'Enfant Plaza end of the train. Our understanding is that when the operator keyed up the train, he did not have sufficient voltage to move the train. As we know, in rail transportation, in operations and maintenance, is that once a train gets into an area where there is a loss or a diminished level of third-rail power, that the train does not go into an emergency state immediately and that there is a period of time before the air pressure leaks and the train goes into an emergency state. But the reports that I received after the investigation was done was that the train was in a place that prevented it from having the -- even though the train had not gone into emergency state, when the train attempted to move, it would not have the necessary power to -- the 750 volts available to it to enable the train to move out of that section of the track.

MR. BUCHER: Okay. Could you give us a copy of that report?

MR. BALLARD: I will work with the technical engineering

group to get you a copy of the report.

DR. POLAND: Thank you. And we will enter that into -- as an exhibit and enter it into the docket.

Do you need -- would we refer to that as a post-accident review from WMATA or is there a better name for us to refer to that document?

MR. BALLARD: There is the report, but I'm not sure today what the specific title of that report would be. But once I get that report, then I'll be able to forward that information to you, let you know what the title of the report is and the report.

DR. POLAND: In the meantime, can we refer to it as a post-accident report from WMATA and we'll know what we're talking about?

MR. BALLARD: Yes, ma'am.

DR. POLAND: Thank you.

MR. BUCHER: Okay. I have a second follow-up question for Mr. Ballard, and it refers to Train 510 arriving at the L'Enfant Plaza Station. And I understand that from the track layout at L'Enfant Plaza, the ability for trains to change tracks -- and my question refers to the 510 arriving -- in the control center, why was the 510 not routed down the Green Line in an emergency?

MR. BALLARD: Your question is why was Train 510 not routed to the Green Line?

MR. BUCHER: Yes.

MR. BALLARD: Once Train 510 arrived on the platform at L'Enfant Plaza, there was a transit officer there on the platform. The transit officer assisted the train operator onto the -- train onto the platform, instructed the train operator to offload the train, and ordered the train operator off the train and out of the station. So the train did not continue towards Branch Avenue because the transit officer felt that the train should be offloaded.

MR. BUCHER: Okay. Thank you. And my last question for Mr. Ballard and possibly Mr. Bodmer. You mentioned that you conducted a risk assessment post-accident. Can you elaborate on that risk assessment?

MR. BALLARD: I did not do a risk assessment. Maybe MR. Bodmer can answer that?

MR. BODMER: Yeah, we have not done a risk assessment after this accident.

MR. BUCHER: Okay. Thank you.

I pass questioning to Mr. Downs.

MR. DOWNS: Thank you. A follow-up to Mr. Bucher's question, we had a discussion a little bit ago about the Rail Operations Plan Book for Major Incidents. This question would go to Mr. Bodmer and maybe Mr. Ballard, as well. In that particular document which I have here, that's basically the checklist we were referring to, is that correct, in terms of step by step processes to follow in certain circumstances?

DR. POLAND: Mr. Downs, can you tell us what the title of that document is, please?

MR. DOWNS: Yeah, I just did. It's the Rail Operations Plan Book for Major Incidents. It's referenced in the Survival Factors Factual Report.

DR. POLAND: Great. Thank you.

MR. DOWNS: Again, the question is: Is that basically the checklist you were referring to?

MR. BALLARD: I'm not sure it's the checklist document. If I could -- is there -- are there checklists within that document?

MR. DOWNS: Well, that's what it appears to be is a checklist, a step by step process for how to proceed, for the Rail OCC to proceed in certain events. And the particular events on page 12, fire and stations-trains-right of way. And going down the list, right of way -- right away, not right of way -- fire/heavy smoke, and it says -- it's a little check box, cops, MOC, rail supervisor, and so on. And the next bullet is stop all trains in both directions. So, basically, the question is: Is that the checklist you were referring to that the ROCC would follow?

MR. BALLARD: I won't be able to specifically say that's the checklist, but the checklist that we have in OCC has similar information, if not the exact information that you're looking at on that checklist, yes, sir.

MR. DOWNS: Great. Follow-up to that question. For the bullet here, stop all trains in both directions, in this case -- we did have the 510 train roll into L'Enfant Plaza about 7 minutes after the 302 train had reported that they were stopped in the tunnel. Looking back at the schedule of the trains, that 510 train had not arrived at the Archives Station yet. So the question is why wasn't the 510 train stopped at the Archives Station?

MR. BALLARD: In my interview with the persons involved, after the incident occurred, I was told that the plan was to have 510 train continue towards Branch Avenue because OCC was operating with the understanding that the problem was isolated between -- within the tunnel area between L'Enfant Plaza and the portal going to Pentagon, and that Train 510 could safely move through the area, L'Enfant Plaza, into a separate tunnel going towards Branch Avenue.

MR. DOWNS: So was it a case -- it sounds like, and correct me if I'm wrong, it sounds like the ROCC was not aware of the degree of smoke that was occurring in the L'Enfant Plaza Station at that time?

MR. BALLARD: At Train 302, when 302 entered L'Enfant Plaza, before going into the tunnel, the operator reported that the platform was clear of smoke. So OCC was operating under the understanding that the problem was located in the tunnel, as opposed to the problem being there at the station itself. So OCC

was operating under the understanding that it would be safe for Train 510 to move through the platform at L'Enfant Plaza and continue because it was a separate tunnel towards Branch Avenue.

MR. DOWNS: But with the report of the smoke in the station at about that same time, wouldn't that suggest that there is a fire in the station?

CHAIRMAN HART: Is that speculative?

MR. BALLARD: OCC got the alarm at 3:20 and 59 seconds letting them know that there was a fire. I don't know sitting here today that OCC deduced that there was a fire, that there was a smoke in the station when they allowed Train 510 to enter the platform.

CHAIRMAN HART: We only want to know what the facts are that you know, not -- no speculation, please.

MR. DOWNS: The Rail OCC has these large video screens, correct me if I'm wrong, that do show the views from the various security cameras in the station; is that correct?

MR. BALLARD: Yes, sir, they do.

MR. DOWNS: And is the fidelity of those cameras capable of showing the degree of smoke that might be in the station real-time?

MR. BALLARD: Yes, they are, but on this particular day, I'm not aware as to whether or not OCC viewed the station cameras or they had access to the station cameras, so I'm not sure what information as it relates to the condition of the platform at

L'Enfant Plaza that OCC had available to them at that moment that they made the decision to allow Train 510 to enter the platform at L'Enfant Plaza.

MR. DOWNS: Thank you. My time is up. I'll turn it back to Mr. Blackistone.

MR. BLACKISTONE: Thank you. We heard some discussion earlier about the incident command post at the scene. I'd like to direct a question to Chief Goldstein as to whether or not Montgomery County, or what are Montgomery County's policies regarding incident command posts, both who is to be there and what are the things that need to be done at the command post?

MR. GOLDSTEIN: As this incident unfolded and as a result of this incident, the Council of Government fire chiefs directed the Passenger Rail Subcommittee to look at all the regional policies. Mr. Bodmer talked about that earlier. Our policy specifically was dated and identified that our incident commander would be at the kiosk. That was not how we operated and that's not how we operate today.

All of the regional fire departments operate with their responding chief officer battalion chief, traditionally, as a stationary command post in the bus bay or the top-level component, most or best access via vehicle, an SUV, as you heard described earlier. That incident command post is where your battalion chief or chief officer will establish, where there'll be a representative of the transit police arriving.

You also, depending upon the incident specific, see a local law enforcement, county police or MPD, any other specialist from WMATA or building representatives. As we deal with some of these structures over top of Metro stations, you'll have a building representative from that structure itself.

So as we've identified unified command as a component, that's traditionally OC -- excuse me -- on-scene commander and the fire representative. You also have elements from local law enforcement, building representatives or those are represented by that structure that may also be involved at that unified command post.

Those start off as small SUVs, Suburbans or Tahoes, as an example, and then in a large-scale event like this, that would be transitioned ideally into a mobile command post vehicle and then, more suitably, into a hard structure nearby, because these are events where there's dozens of people or usually close to a dozen people that are integral in the information-sharing and the management of that incident. And you can't be in a vehicle, be it a SUV nor even a mobile command vehicle and adequately have those folks together for planning, briefing or strategy meetings.

MR. BLACKISTONE: And secondly, I wanted to follow up on some discussion earlier regarding training. Could you describe briefly the training that both Montgomery County Fire and Rescue and the local fire and rescue departments in Montgomery County do both in terms of hands-on training and then larger scenario

training?

MR. GOLDSTEIN: Mr. Bodmer talked about the exercises, and those exercises are critical more towards the full-scale and the tabletops. All of the regional fire departments initiate a recruit-level or initial level of training to all of our new personnel. That's then followed up by company-level training, and then a specialized training opportunity, because the extrication of personnel, or passengers, that are entrapped underneath these cars is a unique and specialized skill. So you have recruit initial training, company-level training. That should be followed up with a refresher or a reoccurring training level, specialized training for the rescue components or the extrication elements, command-level training, as we heard, through the joint supervisory operations and those training elements, and then full-scales or tabletops.

One of the components that has been charged to the Passenger Rail Subcommittee by the fire chiefs is to develop a training plan in conjunction with Mr. Bodmer's office at OEM so that there is a set criteria. One could best describe it as something similar to the ICS tiering. So you have a training at the initial level through command-level training, and that'd be a progressive component. That's in the works, and it is a product that we hope to see shortly.

MR. BLACKISTONE: Good. Thank you. My final question goes, really, to both of the WMATA representatives. At the

beginning of this Panel, you described a very hectic, high level of activity at the ROCC, which probably was out of the ordinary, but I suspect not totally unprecedented. What kinds of plans or preparations do you do for these very high-stress, high-incident times when you have a number of things going on? I suspect this was probably not unprecedented, but -- so how do you prepare for this sort of thing?

MR. BALLARD: In the rail control center itself, we try to select individuals who are capable of managing multiple incidents. The control center on a normal day, weekend, holiday is relatively quiet. The system is fully automatic, and normally, there's not a lot of interaction needed by OCC -- moving. On the days that incidents occur, it's part of my training, you know, it's part of the director of OCC's training now is that we train like the fire department, we train like individuals in the emergency room, to respond to those incidents when they occur. On a normal day, it's easy. There's not a lot to do. But when things happen, that's when the controllers actually, their training comes into use. The controllers are trained to respond to emergency type situations.

So one of the things that we're also looking at, back in July of this year, we got additional positions within OCC. And we're looking at the -- moving to an incident controller, so when situations occur, the incident could be moved to the incident controller. The incident controller will manage that situation.

And then when the situation is under control, then the section of track would be moved back to the controllers who would normally manage the system.

But of course, I'm not saying that the controllers aren't capable of handling the situations that they're presented with in the OCC. It's just that that would be a different approach which would allow us to make sure that there's better movement of the trains, the system trains that are not involved in the incident itself. So it's not a decision that's being made because I don't feel that the controllers can't handle the situation. It's that I think it would be more efficient, you know, in management of the system, the remainder of the system, by having an incident controller to manage certain incidents.

MR. BLACKISTONE: Great. Thank you very much.

And Dr. Poland, that concludes our panel's questions.

DR. POLAND: Chairman Hart, that concludes the technical panelists' second round of questions for Panel 2.

CHAIRMAN HART: Thank you very much. Before we close, Dr. Poland, can you please review the exhibit items that have been requested from this panel session?

DR. POLAND: Yes. And I'll ask Mr. Allen to review those at this time, as well.

MR. ALLEN: Okay. On Panel 2, we have requested -- I'll do it a little out of order -- from Montgomery County, we're looking for the 911 call scripts for how 911 operators deal with

calls from WMATA. The rest of the requests are to WMATA. The Rail OCC scripts for the controllers for dealing with incidents. We're going to check the docket and see if the WMATA playbook for handling smoke ventilation issues is in our docket. If not, that's a request to WMATA. We've requested an update for Exhibit D-1. We have the 2014 version in the docket. We need the 2015 version, please. We're looking for the documentation on where the 305 smoke alarm was received and why it was not received in the Rail OCC. We are looking for the WMATA protocol for handling ventilation in tunnels. We made a similar request for Panel 1. It may be the same document, and to the extent it is a different document, we would request both, please. The WMATA, what we're calling the post-accident review. We understand it may have a different title, ultimately, but whatever that is called, we would like that, please.

And, Mr. Chairman, that's all I have for this panel. Thank you.

CHAIRMAN HART: Thank you. That concludes the second panel and the first day of this hearing. So I would like to thank Dr. Poland for your guidance and leadership. I'd like to thank the tech panel for some very probing and informative questions. I'd like to thank the parties for their full engagement in this process. And last but not least, thank the panel that had to be the lions in the coliseum, as we were beating up on you, and I thank you for your very helpful answers in this process, as well.

MEMBER SUMWALT: And you wanted to thank your colleagues for the great questions, too, right?

CHAIRMAN HART: And I want to thank my colleagues for the great questions, obviously.

MEMBER SUMWALT: That's what I thought.

CHAIRMAN HART: Yes. So we will reconvene again tomorrow at 9:00, and we are adjourned for the day. Thank you.

(Whereupon, at 5:08 p.m., the hearing was adjourned.)

CERTIFICATE

This is to certify that the attached proceeding before the

NATIONAL TRANSPORTATION SAFETY BOARD

INVESTIGATION OF:	WMATA SMOKE AND ELECTRICAL ARCING ACCIDENT IN WASHINGTON, D.C.
PLACE:	Washington, D.C.
DATE:	June 23, 2015

was held according to the record, and that this is the original, complete, true and accurate transcript which has been compared to the recording accomplished at the hearing.

_____
Edward Schweitzer
Official Reporter