

THOMAS P. DINAPOLI  
COMPTROLLER



110 STATE STREET  
ALBANY, NEW YORK 12236

STATE OF NEW YORK  
OFFICE OF THE STATE COMPTROLLER

August 19, 2020

Mr. Patrick J. Foye  
Chairman and Chief Executive Officer  
Metropolitan Transportation Authority  
2 Broadway  
New York, NY 10004

Re: New York City Transit: Signal  
Maintenance, Inspections, and  
Testing  
Report 2019-F-58

Dear Mr. Foye:

Pursuant to the State Comptroller's authority as set forth in Article X, Section 5 of the State Constitution and Section 2803 of the Public Authorities Law, we have followed up on the actions taken by officials of the Metropolitan Transportation Authority (MTA) – New York City Transit (NYCT) to implement the recommendations contained in our audit report *Signal Maintenance, Inspections, and Testing* (Report [2017-S-6](#)).

**Background, Scope, and Objective**

The MTA is a public benefit corporation established by the State Legislature. NYCT is an agency of the MTA that provides rapid transit services in the Bronx, Brooklyn, Manhattan, and Queens by operating the New York City subway.

NYCT Department of Subways' (Subways) Maintenance of Way division (MOW) has eight operating subdivisions; among them, Electrical is responsible for Power and Signals. Subway track is divided into sections for maintenance purposes. As of January 15, 2020, Subways reported that the signal system had 45,001 signal devices divided among 121 section locations. NYCT employs Signal Maintainers, who are responsible for the maintenance, inspection, and testing (MIT) of the equipment at their assigned section locations.

Signal maintenance is critical in preventing subway delay. MIT work is performed based on predetermined intervals (frequency + tolerance), measured in days. The tolerance allows for various issues, such as lack of track access and emergencies, which may affect compliance with frequency standards. Each section location has a logbook where Signal Maintainers are required to record MIT information. The two main parts of the logbook are the body, which the Signal Maintainers and signal helpers use to sign in and out and record the actual work done; and the back, which is used to summarize the work performed, including a description of the device, the interval in which the MIT should be performed, each test/task performed, and the date the MIT was performed. Information from the logbook is entered, usually by a Maintenance Supervisor, into the Integrated Signals' Equipment Information System (iSEIS) and

Enterprise Asset Management (EAM), Signals' internal database. The EAM system, still under development, will capture real-time testing and maintenance through hand-held devices.

In 1991, Congress directed the Federal Transit Administration to establish a State Safety Oversight Program. In New York State, it is the Public Transportation Safety Board (PTSB) that reviews and approves NYCT's System Safety Program Plan (SSPP), which outlines when MIT is required. According to NYCT, Signal Maintainers completed approximately 116,289 MIT activities, excluding supervisor validations, from October 18, 2018 through March 13, 2020, plus 31,704 supervisor inspections and supervisor validations from October 18, 2018 through December 31, 2019. As reported in our initial audit, from January 1, 2015 to October 31, 2017, Signal Maintainers completed 348,143 MIT activities.

Our initial audit found that Signals did not always perform MIT of its signal equipment within the required intervals. For example, at Howard Beach and Pelham, 450 of the 1,280 MIT activities (35 percent) required from January 1, 2015 to May 16, 2017 were not done within the required intervals. Maintenance Supervisors are required to inspect all of the devices within their section locations annually or as directed by Signals management. We found that 39,194 of the annual inspections (76 percent) were done late. In addition, we identified 2,345 devices that were on the Signal Device Master List (SDML) but were not inspected by a Supervisor during this period. Moreover, NYCT is required to review the SSPP annually, and any modifications must be submitted to the PTSB for review and approval. However, NYCT did not update its SSPP for at least one of the Task Codes we examined.

Signals did not have an inventory system to account for all of the equipment (units) it maintains. NYCT's assets represent a significant investment. We selected three device categories and estimated (based on data from NYCT) the value of this equipment to be approximately \$235 million. For example, signal relays, which are reported at an estimated 350,000 units in the SSPP, come in different types and cost per unit. Using the lowest unit price provided by NYCT, the potential total cost of the units was \$175 million (350,000 × \$500). NYCT officials advised us at the time that the EAM system will also manage the inventory and would take about three years to complete.

Our initial audit report, issued on October 17, 2018, contained 18 recommendations. The objective of our follow-up review was to assess the extent of implementation, as of July 17, 2020, of those recommendations.

### **Summary Conclusions and Status of Audit Recommendations**

We found that NYCT officials have made progress in addressing the issues identified in our initial report. Of the 18 prior audit recommendations, three were implemented, ten were partially implemented, and five were not implemented.

### **Follow-Up Observations**

#### **Recommendation 1**

*Remind Signal Maintainers and Maintenance Supervisors of logbook and iSEIS policies and guidelines.*

Status – Partially Implemented

Agency Action – In their 90-day response to the original audit, NYCT officials stated they issued

directives “which reminded all Signals Division personnel of the policies and guidelines for logbook and iSEIS database entries” and will reissue them annually. However, Directive O17-36 (and its annual update) only addresses the procedures for logbook entries, and F18-07 (and its annual update) addresses logbook audits; neither directive addresses iSEIS policies and guidelines.

### **Recommendation 2**

*Periodically review logbook entries to ensure compliance with Electrical division guidelines and document such review.*

Status – Partially Implemented

Agency Action – In their 90-day response to the original audit, NYCT officials indicated the Signals division and the independent EAM group perform monthly audits and a sample of logbook audits, respectively. We reviewed whether logbook audits were performed at two locations: the Compressor Squad (Section 801) and 34th Street and 11th Avenue (Section 168). We found the requisite audits were performed by both units at Section 168, but only one monthly audit was performed, in February 2020, at Section 801.

### **Recommendation 3**

*Timely update the SSPP to reflect any procedural modifications to the SSPP internally.*

Status – Partially Implemented

Agency Action – We selected a sample of 10 devices and reviewed 27 maintenance tasks from October 18, 2018 through January 31, 2020 to determine if maintenance was done as required. The review showed that maintenance intervals were changed and do not agree with the 90-day requirement in SSPP. For example, the SDML and the Compressor Squad logbooks indicate a maintenance interval of 180 days for aftercoolers (mechanical heat exchangers) and dryers and 365 days for oil separator condensates and tanks. However, according to the SSPP, maintenance tasks for compressor equipment are to be performed at 90-day intervals. At the closing conference, NYCT officials explained to us that maintenance is not part of the SSPP, but we advised them that this is not the case. They then qualified their statement, stating “light” maintenance for certain components is not in the SSPP. However, different levels of maintenance are not delineated in the SSPP.

### **Recommendation 4**

*Timely document and communicate procedural changes and updates to the SSPP to the PTSB.*

Status – Partially Implemented

Agency Action – There was one change from the 2018 SSPP compared to the 2019 Agency Safety Plan (ASP), previously named SSPP, which pertained to relay racks.

According to PTSB officials, they were notified of changes to the SSPP/ASP in a timely fashion – ongoing throughout the year and not just annually when the SSPP/ASP was submitted – including being notified of the change in interval for relay racks updated per regulation. However, as noted in Recommendation 5, there are Task Codes in iSEIS that are not updated in the SSPP/ASP.

### **Recommendation 5**

*Ensure iSEIS only lists valid Task Codes.*

Status – Not Implemented

Agency Action – We noted the iSEIS and INFOR systems show that 6,761 tests were performed in calendar year 2019 and as of March 13, 2020 using Task Codes that are not listed in NYCT's 2018 SSPP and 2019 ASP.

### **Recommendation 6**

*Review and allocate resources to ensure that all signal devices are maintained, inspected, and tested in accordance with applicable standards.*

Status – Partially Implemented

Agency Action – NYCT officials reviewed and allocated their staffing levels; however, those actions have not resulted in all signal devices being maintained, inspected, and tested in accordance with applicable standards. We selected 10 devices maintained by the Compressor Squad and reviewed 27 maintenance tasks performed from October 18, 2018 through January 31, 2020 to see if maintenance was done as required. Of the 27 maintenance tasks performed, 11 were performed within the required interval (90 days plus a 15-day tolerance) and 16 were late. The 16 maintenance tasks were performed between 12 and 314 days late. In addition, there were 8 required maintenance tasks that had not yet been performed, and were overdue as of January 31, 2020, ranging from 3 to 205 days.

### **Recommendation 7**

*Ensure inventory of parts is up to date to prevent delays in repairs.*

Status – Implemented

Agency Action – We reviewed the Compressor Squad trouble calls reports from October 18, 2018 through February 17, 2020 for 10 sampled signal devices. Trouble calls received by the Compressor Squad were attended to and repairs were done in 1 to 11 days with no delays due to parts.

### **Recommendation 8**

*Ensure weekly reports are submitted, reviewed, and approved timely, and develop procedures to address when reports are submitted.*

Status – Not Implemented

Agency Action – Weekly reports were not always submitted, reviewed, and approved timely and procedures were not developed to address when the weekly reports are to be submitted. We reviewed the weekly Signal Air Compressor Inspection and Maintenance Reports for the four weeks ended July 6, 13, 20, and 27 in 2019 and the four weeks ended January 4, 11, 18, and 25 in 2020 for seven plant locations where a total of 56 reports were expected to be submitted by the Signals MOW to the Compressor Squad. Of the 56 expected reports, 33 (59 percent) were received and 23 (41 percent) were not received by the Compressor Squad as of March 3, 2020. Of the 33 reports received, none were

from 8th Avenue and 103rd Street or Grand Central for the four weeks in July 2019 and the four weeks in January 2020. In July 2019, no weekly reports were received from 14th Street and 7th Avenue.

We also noted that:

- 29 of the 33 reports received were late (19 were from 1 to 3 weeks late and 10 were from 4 to 10 weeks late).
- 15 of the 33 reports were not reviewed and signed by the Signals Maintenance Supervisor.
- All 33 reports were reviewed and signed by the Signals Compressors Maintenance Supervisor and the Signals Shop Superintendent.

No procedures were developed to state when the weekly reports are to be submitted.

### **Recommendation 9**

*Review the resources allocated to the Compressor Squad and the logistics of assignments and equipment.*

Status – Implemented

Agency Action – We met with the Compressor Squad on January 23, 2020. During that meeting, it was explained that compressors are being decommissioned as part of NYCT's switch to electronic/computer-based systems, and they have enough staff for the fewer number of compressors. They explained how they assign staff based upon their level of experience. They also demonstrated how INFOR schedules the maintenance due for the upcoming week and the supervisor assigns the work to the maintainers.

### **Recommendation 10**

*Develop and document the following for new technology equipment:*

- *Written procedures or responsibilities for staff in charge of the trouble call desk to ensure consistency and continuity in services for each tour; and*
- *Standards for handling trouble calls and documenting the actions taken, including when follow-up is required.*

Status – Not Implemented

Agency Action – In their 90-day response to the initial audit, NYCT officials stated that NYCT formal procedures for new technology equipment were to be finalized by the third quarter of 2019. We requested the new procedures on March 19, 2020, April 8, 2020, and May 8, 2020, but none were provided. At the closing conference, NYCT officials stated they had procedures and training for trouble calls. The documentation provided did not include procedures for staff in charge of the trouble desk. While it covered trouble calls, there was no indication that anyone had attended training.

### **Recommendation 11**

*Ensure all changes to maintenance interval levels comply with NYCT policies and procedures.*

Status – Not Implemented

Agency Action – Changes to the maintenance interval levels for the Compressor Squad do not comply with NYCT policies and procedures. We selected 10 devices maintained by the Compressor Squad and reviewed 27 maintenance tasks from October 18, 2018 through January 31, 2020 to see if maintenance was done as required. We found that maintenance intervals were changed and do not agree with the 90 days required by NYCT policies and procedures. For example, according to the SDML and the Compressor Squad logbooks, the maintenance interval was 180 days for aftercoolers and dryers and 365 days for oil separator condensates and tanks.

**Recommendation 12**

*Revise the Master List Change Form to require that the originator and the approver state the reason for the change and attach supporting documents.*

Status – Implemented

Agency Action – The Master List Change Form was revised to include a place for the originator and approver to state the reason for the change.

**Recommendation 13**

*Require that all Master List Change Forms be approved by the Engineering division.*

Status – Partially Implemented

Agency Action – In their 90-day response to the initial audit, NYCT officials indicated the Master List Change Form will be revised, and it was. NYCT officials maintain their position that Engineering will be contacted only when the changes impact safety.

**Recommendation 14**

*Periodically review Supervisory Inspection Form records to ensure compliance with procedures.*

Status – Partially Implemented

Agency Action – NYCT issued Directive M18-15 on March 1, 2018 reminding supervisors of proper documentation procedures and that compliance will be reviewed through its internal control process beginning in 2019. We found that NYCT periodically reviews Supervisory Inspection Form records. However, the two reviews showed that 3 of 129 forms sampled were not available. In addition, we also sampled 10 Task Code 200 supervisory inspection tests from iSEIS and INFOR and found that one of the 10 Supervisory Inspection Forms documenting that the inspection was done was not available.

Furthermore, we reviewed annual supervisory inspections (Task Code 200) performed for the period January 1, 2018 through December 31, 2019 and found that many of the required annual inspections were not done within a year as required. Of the 62,663 annual inspections for this period, 18,597 were completed more than 365 days since the previous inspection, ranging from 366 days to 698 days. In addition, there were 14,247 devices that had an inspection in 2018 but no subsequent inspection.

### **Recommendation 15**

*Develop reporting systems that alert management personnel of instances of non-compliance with supervisory inspections.*

Status – Partially Implemented

Agency Action – In their 90-day response, NYCT officials indicated the EAM system for alerting management will be configured to do so, but in the meantime, NYCT periodically reviews inspection records. At our opening conference on January 9, 2020, NYCT officials told us the EAM system has not been implemented, but they are working on it.

### **Recommendation 16**

*Periodically review logbook entries and information recorded in the Supervisory Validation to ensure compliance with departmental guidelines.*

Status – Partially Implemented

Agency Action – In their 90-day response, NYCT officials indicated that additional controls related to logbook entries were implemented and that the Supervisory Validation procedure will be revised.

### **Recommendation 17**

*Implement a control in iSEIS to check whether Signal Maintainers have been proficiency tested within the prior six months every time a device test is entered.*

Status – Not Implemented

Agency Action – In their 90-day response, NYCT officials indicated they continue to disagree with this recommendation and will not devote resources to enhancements of iSEIS because the EAM system, which is under development, will replace this legacy system. However, the EAM system is still not fully implemented.

### **Recommendation 18**

*Develop a perpetual inventory system for signal maintenance equipment.*

Status – Partially Implemented

Agency Action – At our opening conference on January 9, 2020, NYCT officials stated they have three employees tagging and entering items into their database (INFOR). However, previously, they prepared a budget that said they need 30 people to complete the task in three years, and that a higher-level organizational decision would be required to achieve that staffing level. Based on the current staffing level, it will take much longer than three years.

Contributors to this report were Robert C. Mehrhoff, Erica Zawrotniak, Peter Blanchett, and Celedonia Deaver.

We would appreciate your response to this report within 30 days, indicating any actions planned to address any unresolved issues discussed in this report. We thank the management and staff of the MTA for the courtesies and cooperation extended to our auditors during this review.

Very truly yours,

Carmen Maldonado  
Audit Director

cc: M. Woods, Acting Auditor General  
D. Jurgens, MTA, Acting Assistant Auditor General  
Division of the Budget