

**Office of the
NYCHA FEDERAL MONITOR
Bart M. Schwartz
Pursuant to Agreement dated January 31, 2019
260 Madison Avenue, Third Floor
New York, New York 10016
347.809.5555
www.nychamonitor.com**

November 1, 2023

Monitor's Heat Report and Assessment of NYCHA's Preparations for the Current Heating Season

This Monitor report focuses on NYCHA's readiness for the current heating season and our assessment of the work its Heating Department did to prepare. As we have reported, providing proper heating services to residents during the winter largely depends on the effectiveness of NYCHA's preventive maintenance (PM) program during the preceding summer. Since the start of the monitorship, the Monitor team, HUD, and NYCHA have focused a great deal of attention on improving the PM program, and we provide an update on these efforts. The report also includes a summary of the key performance analytics from the last heating season and recommendations for improvements.



Bart M. Schwartz, Federal Monitor

Executive Summary

Our team of subject matter experts has conducted numerous field inspections of NYCHA heating plants and regularly analyzes NYCHA's data regarding both heating performance and NYCHA's efforts to maintain and repair heating equipment. We continue to see improvements by NYCHA's Heating Management Services Department (HMSD) in both the work they did this past summer in executing the PM program as well as the work their repair teams did last heating season in responding to and addressing heating outages. Other areas of improvement include:

- An upgraded training program for both managers and front-line workers Heat Plant Technicians (HPTs);
- Better compliance with the work order (WO) system to capture PM and equipment inspections and identify needed repairs;
- Improved coordination with the third-party contractor hired to perform portions of the boiler overhaul work, which has increased HMSD's capacity to focus on PM;
- Hiring of additional managers and HPTs; and
- Improved overall leadership and management of the now over 700 staff that comprises HMSD.

Based on HMSD's summer PM program plan and execution in 2023, NYCHA should be better prepared to provide proper heating services this winter than it has in many years, and certainly since the start of the monitorship. Additionally, we continue to see a shift at HMSD away from an operational structure that was primarily reactive to heating service outages and other breakdowns to one that is more proactive in anticipating and preparing for coming challenges and more strategic and effective in addressing them.

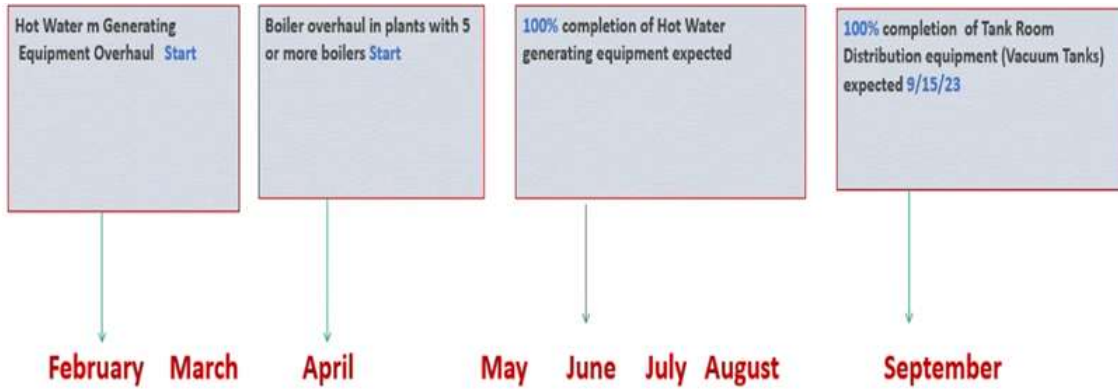
In addition to advancing the areas of improvement listed above, HMSD should place further emphasis on improving the accuracy and completeness of WO data, especially regarding maintenance and outage repair work (and the root causes for equipment breakdowns), and staff analysis of heating conditions when responding to apartment heating complaints. HMSD must also increase the efforts they recently began to focus more attention on their heating distribution systems, particularly the frequent problems of uneven heating within many buildings and units that never seem to receive adequate heat.

Additionally, HMSD and property management must continue their efforts to better communicate and coordinate with one another. It is essential that local property managers and development superintendents be kept abreast of important heating service information and events that affect residents. In turn, property management is responsible for certain critical heating plant conditions, such as maintaining and repairing house pumps¹ and boiler room sump pumps and keeping drains open and clear. Establishing clearer structures for more effective interactions between HMSD staff and their property management counterparts must continue to improve.

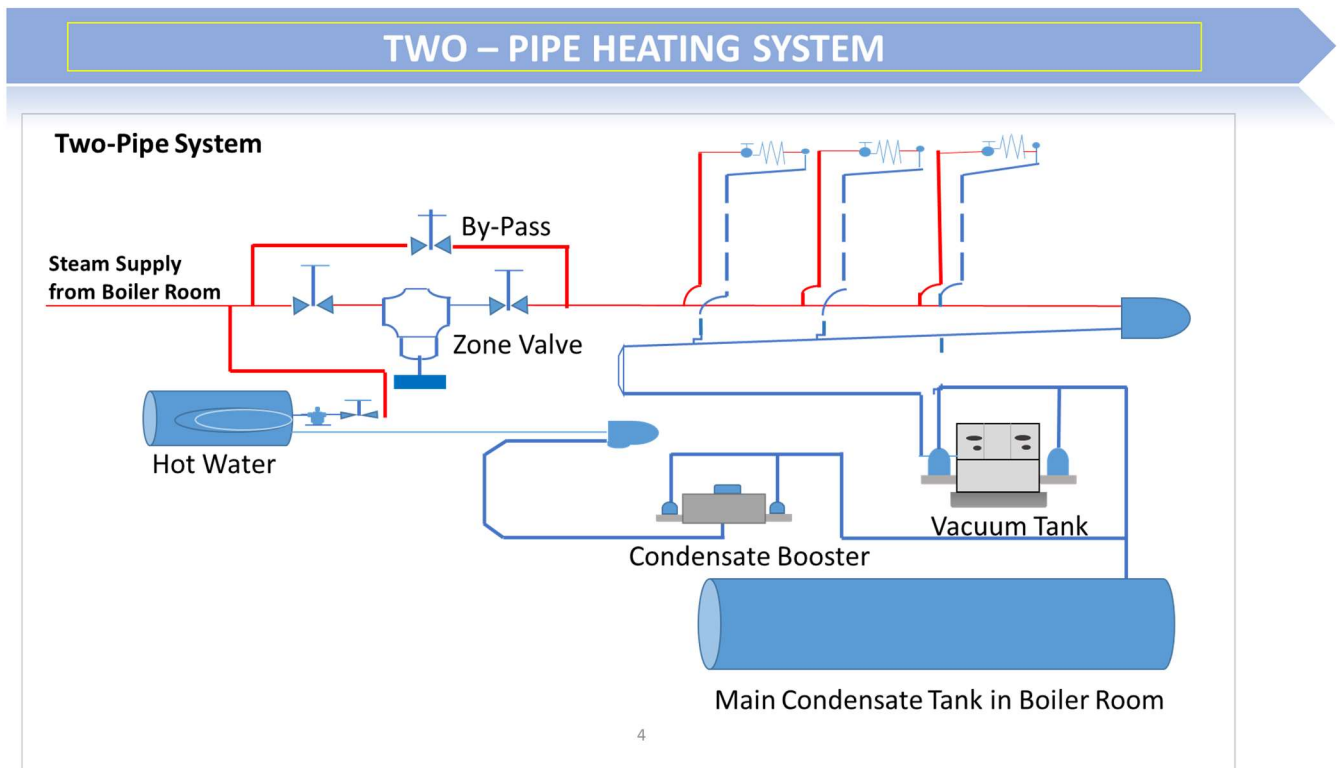
I. Background

The summer PM program starts in the early Spring and extends to the start of the heating season on October 1st (see below). It entails performing maintenance on all heating equipment (cleaning, lubricating, replacing worn components, etc.), conducting thorough equipment inspections to identify all needed repairs and replacements, and then completing this work. NYCHA's heating infrastructure is extensive given that it currently has over 250 developments with approximately 1,980 residential buildings and almost 162,000 apartments, all requiring heat. While its boilers are the main equipment – over 1,100 to inspect and overhaul every summer – NYCHA has several thousand additional pieces of other essential heating equipment that must also be maintained and replaced when necessary. Given the vast amount of heating equipment to be serviced during this annual process, NYCHA's summer PM program is an extensive undertaking that must be comprehensively structured, sufficiently resourced, and well executed in order to succeed.

¹ House pumps, located in development building basements, receive all the building's water from the roof tanks to be provided throughout the building, including for the heating systems. House pumps should be regularly inspected by property management for leaks or other problems and any needed repairs should be completed.



NYCHA’s heating systems generally consist of: (i) the equipment needed to first produce the heat (usually boilers), including the structures to provide the fuel to power them and the water to be heated, and (ii) all the equipment required to deliver the heat throughout the buildings and into individual apartments, including condensate and vacuum tanks to draw heat to and from the boilers, heating pipes that carry heat from boilers to apartments, and radiators that then release heat in apartments for residents. The schematic below depicts a two-pipe heating distribution system which most NYCHA buildings use. Adequate heating requires that both production and distribution systems are performing properly, and the summer PM program must address both.



As with NYCHA infrastructure generally, much of the heating equipment is old and often in poor condition. Proper maintenance is essential until the poor-performing pieces can be replaced with newer equipment by NYCHA’s Asset & Capital Management (A&CM)

department. For many years, increased equipment breakdowns causing outages often required NYCHA's heating staff to respond and fix this equipment rather than complete routine maintenance work during the heating season. Over time, this decline in regular maintenance work contributed to the current degraded condition of a significant portion of NYCHA's heating equipment. Until recently, this trend created a downward cycle where less maintenance caused even more equipment failures, further straining staffing resources leading to even less maintenance work. The downward cycle was exacerbated by the fact that heating staff, especially new recruits, were generally not being properly trained or sufficiently managed regarding core heating procedures.

At the start of the monitorship in 2019 and 2020, heating plant inspections by the Monitor team and NYCHA's Environmental Health & Safety Heat Oversight Team (EHS) revealed the poor condition of a significant portion of the equipment and that it was not being adequately maintained. Field interviews with staff made clear that there was a need for more consistent management and comprehensive training, as many HPTs and even some managers didn't understand basic heating standard operating procedures (SOPs) for equipment maintenance. Additionally, the heat WO data was incomplete and was not being used by managers to either monitor staff performance or set work strategies. The Monitor and EHS issued various regular reports to HMSD underscoring these assessments and made several recommendations for improvements. ([Link to Monitor-2022 Heat PM Report](#))

NYCHA began taking significant steps in early 2022 to increase resources and management support for HMSD, including implementing measures to address many of the Monitor team, EHS and HUD recommendations. NYCHA additionally began to work more collaboratively with both the Monitor team and HUD to establish a more comprehensive summer PM program, resulting in a written plan with clearer staff work directives that prioritized NYCHA's worst performing heating plants. The strategy was to make sure all equipment was properly overhauled, maintained and repaired at these sites before moving on to developments with fewer PM needs. In addition to working with HMSD to develop this plan, heating specialists from both the Monitor team and EHS conducted regular field inspections at development boiler and tank rooms in coordination with HMSD to assess the quality of work done and whether PM protocols were being followed. Detailed reports (with numerous photographs) were then prepared and provided to HMSD with inspection results, the highlights of which were discussed at weekly meetings that also included reports from HMSD on their PM progress as they worked to complete the program by October 1st. This enabled HMSD to make quick course corrections to address any deficiencies found.

This past summer marks the second year that HMSD has employed this summer PM strategy, with some additional improvements which are discussed below. We can report that NYCHA's heating services are continuing to trend in the right direction, and further improvements are expected as HMSD, the Monitor team, EHS and HUD work together to leverage existing resources more effectively and strategically to better maintain equipment and address failures when they do happen. The role of the Monitor team is not only to provide objective assessments and reporting on the current state of conditions at NYCHA, but also to work with NYCHA to continually look ahead and identify and then implement potential opportunities for additional improvements.

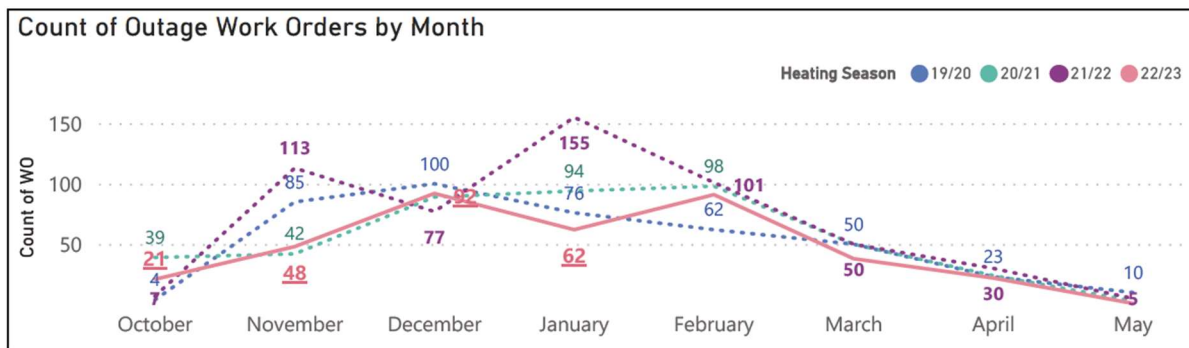
II. Summary of NYCHA’s Heating Performance Last Winter

The most important measure of NYCHA’s heating services is whether residents are receiving adequate heat during the heating season, which runs annually from October 1st through May 31st. Everything NYCHA does – from HMSD’s summer PM program to A&CM’s heating system replacement projects – is directed to this primary goal. Consistent with this, the HUD Agreement (Agreement) commits NYCHA to meeting specific heating performance metrics mainly focused on reducing the number and duration of *outages*.² Agreement obligations also include performance metrics for individual apartment heating conditions separate from outages, which are discussed in greater detail below.

The last heating season (2022/23) demonstrated HMSD’s overall improvement relative to years prior, particularly the first three winters of the monitorship. The following charts and summaries recap NYCHA’s performance with respect to the three main heating metrics – the number of outages, their durations, and the number of individual apartment heating complaints that are not part of outages.

The number of heating outages

Knowing the *number* of outages and their trend over time as to whether they are increasing or decreasing is an essential key performance indicator for NYCHA’s overall heating services. NYCHA decreased the number of its outages by 30% in 2022/23 over 2021/22.



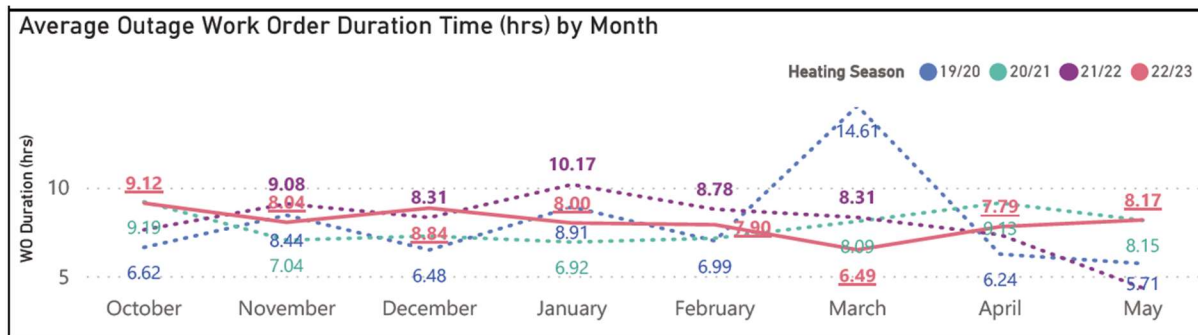
There were 379 unplanned heating outages this past season compared to 546 outages during the 2021/22 heating season. Total outages in the 2022/23 heating season were also the lowest in the past four years. Improvements experienced in the 2022/23 heating season, documented in the Monitor’s 2022 Heat Season Report were largely attributed to an improved 2022 Summer PM program, effective utilization of a third-party vendor for assistance, and improved processes and adherence to the SOP throughout the heating season.³

² *Outages* happen when multiple apartment units experience temperatures below legal requirements caused by a breakdown in heating services that affect at least an entire building stairhall, sometimes a whole building, and even an entire development. The root cause generally stems from a single source – often a malfunctioning boiler or major blockage in the building’s steam heat system – that cuts off sufficient heat to multiple units.

³ Link to report - <https://filecloud.guidepostsolutions.com/url/smfurashc7mdqucg>

The duration of heating outages

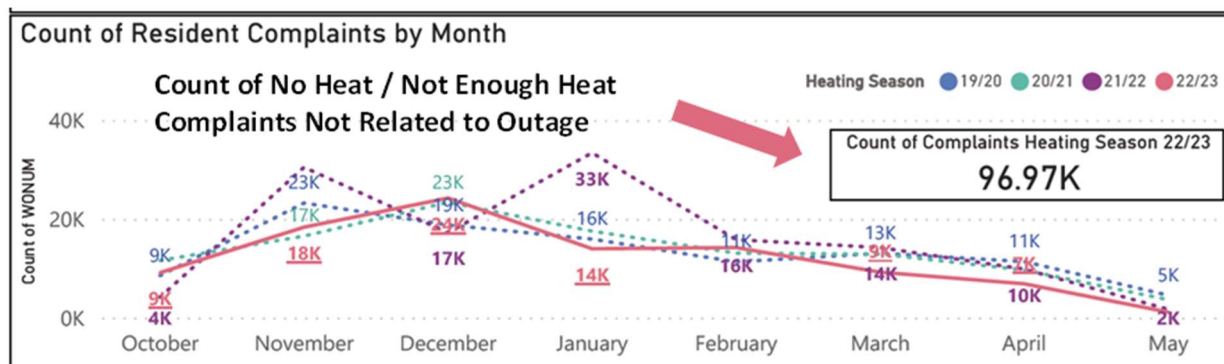
Tracking the *duration* of outages is also essential to understanding their impact on residents. The longer they last the more buildings lose heat. While NYCHA’s buildings are substantially built with thick walls that generally hold in heat well, other factors such as old and improperly maintained apartment windows in many NYCHA apartments create drafts leading to significant heat loss. NYCHA’s outages in 2022/23 were on average 10% shorter than they were in 2021/22.



The Monitor team attributes this past heating season’s reduction in the average outage duration time in part to closer coordination between the newly reconfigured Heat Desk and HMSD field staff who now receive faster and more detailed notifications of possible outages. Additionally, NYCHA created a comprehensive heating dashboard to better track and monitor outages across NYCHA, which is overseen by the Heat Desk.

Individual apartment heating shortages

Lastly, compiling the number and locations of apartment heat shortages that are not part of outages is also important, not only because the Agreement mandates it, but because NYCHA’s ailing heat distribution systems cut off adequate heating to whole building sections, resulting in many apartments that then remain chronically cold all winter. This important aspect of NYCHA’s heating services is discussed in more detail later in this report.



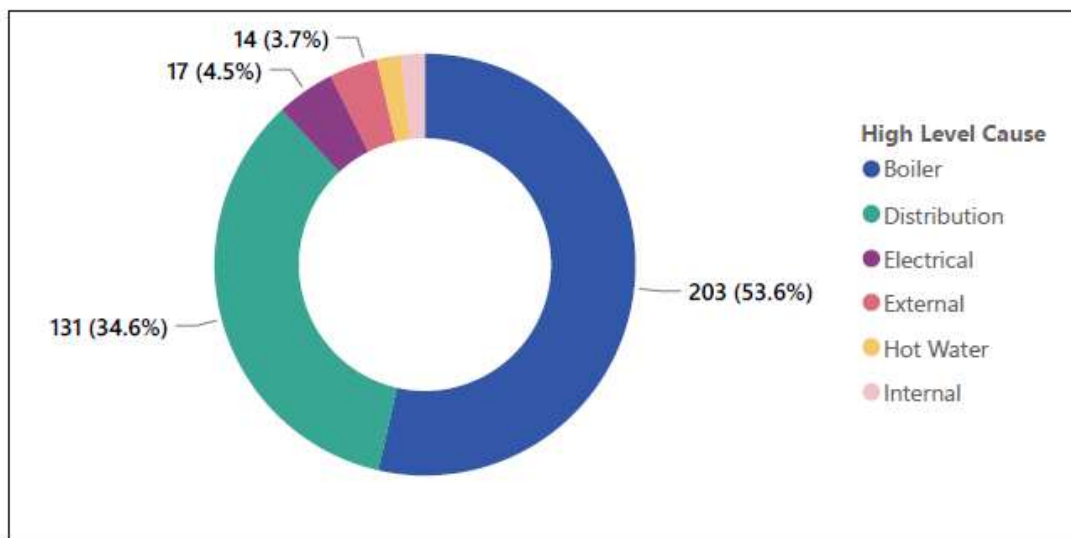
During the 2022/23 heating season, residents made approximately 97,000 heat complaints not related to outages to NYCHA’s complaint line, which were then captured

on NYCHA's database system Maximo. This is the lowest number of such complaints made by residents since the start of the monitorship.⁴

When the outside temperature is below 55F, heating complaints not related to outages are logged into Maximo, as they should be. However, if/when the outside temperature exceeds 55F and one or more of these complaints have not been addressed, HMSD staff will close all such complaint work orders without responding to the apartments or speaking with the residents. HMSD's rationale is that heat is not being provided when temperatures rise above 55 degrees, so these complaints cannot be assessed. The Monitor team strongly disagrees with this practice as it unnecessarily delays investigating potential apartment heating shortage conditions, and it negatively impacts residents' perceptions regarding the quality of NYCHA's heating service, especially because NYCHA does not explain to residents that staff will not respond to heating complaints under these circumstances.

Last Winter's Heating Outage Root Causes

The two main aspects of its heating systems that caused outages in 2022/23 at NYCHA developments were either breakdowns of the boilers – a heat *production* issue – or failures related to the heating *distribution* systems needed to carry that heat from the boilers to the individual apartments. The chart below is a visualization of the main root causes of NYCHA's heating outages this past winter.



While Maximo data showed an increase in boiler mechanical breakdowns (which accounted for almost 54% of NYCHA's total heat outages this past season), our further analysis shows that HMSD staff sometimes erroneously categorized an outage cause as boiler-related when other information in the same WOs indicated it was more likely from a distribution failure. Also, during weekly HMSD meetings, HMSD generally reported that most outages were the result of distribution breakdowns, especially the ones of longer duration.

⁴ A small portion of the drop in complaints may be attributable to the fact that some developments converted to RAD/PACT in the last two years and are therefore no longer under NYCHA management.

HMSD leadership has acknowledged this data accuracy problem and explained that HMSD is now working with NYCHA's IT department to reduce the number of outage cause and repair codes to create a more data driven process to show when an outage is directly related to either heat production or distribution system asset(s). The following are the four main causes of NYCHA heat and hot water outages that will be used to develop this revised code system.

Equipment Failure

Equipment failure is the cause that can be used to identify when a specific asset fails.

Distribution

Distribution causes result from plumbing leaks related to building and or underground feed water, steam, domestic water, waste and condensate return piping.

External

External Causes capture service disruptions caused by failures related to utility services such as gas, electricity and water. This can also include actions taken by the FDNY or NYPD (or another agency) at a NYCHA building that lead to heating shutdowns.

Sectional

Sectional outages capture service disruptions affecting multiple buildings. The causes regarding a sectional outage can be one of the three main causes which are equipment failure, distribution or external. In essence, a sectional outage is a sub-cause resulting from one of the main causes.

The Monitor fully supports the revamping of NYCHA's heating WO codes so that they are more useful to HMSD managers in better understanding the underlying causes of their equipment breakdowns. We are concerned that NYCHA's IT unit predicts that this work will not be completed for many months and well after the conclusion of the current heating season. We will also push HMSD to ensure that once these code revisions are done, staff will be properly trained in their use and that managers will QA staff WO submissions to ensure compliance and accuracy.

III. Summary Assessment of the 2023 Summer PM Program

This section of the report provides a more detailed assessment of the recently completed summer 2023 PM program. As stated, this is the second year that HMSD drafted and then executed a written strategic PM plan. Our overall assessment is that HMSD continued its trend of improvement, and that this summer's performance was better than a year ago.

As we described in our assessment of NYCHA's summer 2022 PM program, the main plan of action was to identify those developments with the greatest heating equipment failures during the 2021/22 winter and prioritize the PM work at these sites as the starting point for the summer program. Once these most critical sites were completed, HMSD staff then moved to the next grouping of sites based on their equipment failures the prior winter, so that by October 1st, the PM program would, at a minimum, complete work on equipment

with the greatest maintenance needs. This strategy worked as NYCHA saw a significant performance improvement this past winter.

This past summer, HMSD did an even better job using its data to both focus its work and track progress. NYCHA's IT unit made improvements to NYCHA's Heat PM Dashboard, with input from the Monitor team and EHS. As with all NYCHA's dashboards, it accesses live data from Maximo to generate real-time analytics for use in driving work plan strategies, assessing progress, and making course corrections where needed. HMSD used the Heat PM Dashboard to create several analytic charts for key PM program components (some examples are below), including boiler overhaul, distribution system PM, PM for other equipment, and equipment inspection progress and resulting corrective maintenance (CM) WOs. These charts were updated on a weekly basis as part of HMSD's Heat Readiness Report throughout the summer, and accessible to HMSD staff, the Monitor team, EH&S and HUD.

For their part, the Monitor team and EHS experts evaluated the summer PM program through both field team oversight and inspections, all done in coordination with HMSD.⁵ The field team's areas of focus included: (i) assessing the boiler overhaul and equipment PM generally at all NYCHA heating plants, whether the work was performed by HMSD or contractors; (ii) analyzing heat WO data to determine the completeness of PM, Inspection (IN) and CM WOs, discussed in greater detail below; and (iii) assessing the results of equipment inspections that identified needed repairs and working with HMSD to prioritize their completion. To facilitate this process, HMSD established an internal planning unit to track and address HMSD's backlogged WOs.

A. Performance Analytic Chart Overview for 2023 PM Program

Throughout the summer, HMSD conducted weekly meetings with the Monitor Team and EHS to discuss PM program progress and challenges. Various analytics charts created from the Heat PM Dashboard were routinely created and used by HMSD during these meetings to both report on PM progress and to identify those sites that are of greatest concern for the coming winter. Examples of these charts are below. As the charts indicate, HMSD and their contractors completed almost all of the boiler overhaul and most of the other PM work prior to October 1st.

Boiler overhaul

While most boiler manufacturers suggest that their boilers be replaced after 25 years in service, the average age of NYCHA's boilers is now 26 years. Additionally, with the reduction in resources and other factors that affected NYCHA's heating staff effectiveness over the last 10 to 15 years, boilers and other heating equipment were not comprehensively maintained.

There are two main types of boilers in NYCHA buildings, conventional boilers that heat water into *steam* to heat the buildings (Chart 1), and hydronic boilers that distribute heated *water* throughout the buildings (Chart 2). Every summer when the boilers can be shut down and drained of water they are *overhauled*. This entails cleaning them of the buildup

⁵ Link to a Monitor Heat Field Inspection Report.  [TT Inspection - Jefferson-May.10.2023 2.pdf](#)

of carbon and water scaling residue, lubricating certain parts, and repairing and/or replacing parts where needed. Overhaul is essential for the efficient operation of the boilers, and when not done or done properly, boilers burn more fuel (either oil or natural gas) and produce less heat than they should. Another important part of overhaul is addressing any leaks that have developed, particularly with the pipes that carry water and the connection points where the pipes enter the boilers, where rust and other metal corrosion has occurred.

At the start of the monitorship in 2019, it became clear to the Monitor team that not all NYCHA boilers were being overhauled every year and that even when work was done, it was often not performed thoroughly. The completion of a thorough annual overhaul for all boilers has been the priority of the summer PM program. As the charts below indicate, NYCHA completed the overhaul work for 98% of its boilers prior to the start of this heating season on October 1st. The main holdup for the remaining boilers was the need to have welding and other more extensive repair work completed before overhaul could be done. NYCHA expects this work to be completed by the end of October.

To complete the overhaul of all its boilers, HMSD not only used its own staff but also two heating contractor companies it hired to conduct this work. Approximately 25% of NYCHA’s heating plants are managed by the two contractors. This entails addressing outages, conducting routine maintenance, and making repairs during the heating season, as well as engaging with HMSD to complete the summer PM program at the sites they manage during the off season. HMSD also uses a heating maintenance vendor to supplement HMSD staff to complete boiler overhaul work at some of the heating plant sites that HMSD manages. Chart 3 below summarizes the work the vendor did in completing their assigned boilers this past summer.

Annual Boiler PMs - PMBOILER							
			2023				
Heatvendor	Geographical Borough	September Goal	Total Inspections	Completed	% Complete	Remaining Inspections	% Remaining
GSH	Brooklyn	100%	13	13	100%	0	0%
	Manhattan	100%	22	22	100%	0	0%
	Queens	100%	27	27	100%	0	0%
NATGRID	Brooklyn	100%	57	57	100%	0	0%
	Queens	100%	7	7	100%	0	0%
NYCHA	Bronx	100%	164	164	100%	0	0%
	Brooklyn	100%	138	138	100%	0	0%
	Manhattan	100%	164	160	98%	4	2%
	Queens	100%	37	37	100%	0	0%
	Staten Island	100%	30	30	100%	0	0%
Grand Total			659	655	99%	4	1%

Chart 1: Boiler overhaul completion chart for NYCHA’s conventional boilers.

Annual Boiler PMs - PMHYDBLR							
			2023				
Heatvendor	Geographical Borough	September Goal	Total Inspections	Completed	% Complete	Remaining Inspections	% Remaining
NYCHA	Bronx	100%	93	93	100%	0	0%
	Brooklyn	100%	278	278	100%	0	0%
	Manhattan	100%	145	145	100%	0	0%
	Queens	100%	2	2	100%	0	0%
Grand Total			518	518	100%	0	0%

Chart 2: Boiler overhaul completion chart for NYCHA's hydronic boilers.

The Metro Group Overhaul Update 10.4.23	
Total Developments Serviced (29)	Total Projected Boilers Serviced (137)
Work in Progress	
Total Projected Boilers By Borough	Completed Today
Bronx (28)	28
Brooklyn (39)	39
Manhattan (53)	51
Queens (13)	13
Staten Island (4)	4
Total completed	135

Chart 3: Boiler overhaul completion chart for the vendor hired by HMSD.

Heat distribution system PM

NYCHA also faces challenges in conducting adequate PM of its heat distribution equipment. The distribution system encompasses all the equipment and piping used to deliver heat from the boilers to the individual apartment radiators. While replacement of the distribution piping in the walls at many NYCHA buildings is needed (as discussed below), this can only be accomplished through extensive capital projects, which is not work that HMSD performs. However, HMSD is tasked with performing routine maintenance of the other parts of the distribution systems, including vacuum tanks, zone valves, supply and return lines, and various traps, air vents, steam traps and debris strainers. Also, as with the boilers, much of this work must take place in the summer when heat is not being produced and the equipment is drained of water.

The Monitor team has expressed concerns about NYCHA's ailing heat distribution systems, both from the perspective of the capital replacement projects needed as well as the need for more consistent distribution PM, including repairs and equipment replacements where required. Without proper PM, distribution systems become clogged with metal particles and other residues that constrict the system's ability to deliver the full amount of heat the boilers are producing. Not only does this waste energy, but over time these clogs increase and eventually choke off the entire system. Over the last two

summers, HMSD has begun to establish a more organized structure for its distribution PM, especially by using data to better track staff progress. As the charts below indicate (Charts 4 and 5), HMSD completed 99% of this maintenance work this past summer, which included the inspections of tank rooms.⁶ We recommend that NYCHA create specific WOs for the main components of the distribution PM to better track work and ensure that all the needed maintenance is being done.

Annual Heating Distribution System PMs - PMHEATDIST							
			2023				
Heatvendor	Geographical Borough	September Goal	Total Inspections	Completed	% Complete	Remaining Inspections	% Remaining
GSH	Brooklyn	100%	28	27	96%	1	4%
	Manhattan	100%	53	52	98%	1	2%
	Queens	100%	53	53	100%	0	0%
NATGRID	Brooklyn	100%	156	156	100%	0	0%
	Manhattan	100%	8	4	50%	4	50%
	Queens	100%	14	14	100%	0	0%
NYCHA	Bronx	100%	366	366	100%	0	0%
	Brooklyn	100%	359	359	100%	0	0%
	Manhattan	100%	382	380	99%	2	1%
	Queens	100%	148	148	100%	0	0%
	Staten Island	100%	69	69	100%	0	0%
Grand Total			1636	1628	100%	8	0%

Chart 4: Completion chart for NYCHA's distribution PM.

Top sites of focus for 2022/23 heating season

As stated, HMSD's strategy for overall system readiness focuses on completing PM at its worst performing sites based on the prior winter's outage data and progressing forward to the sites that experienced fewer equipment breakdowns. To this end, HMSD used the Heat PM Dashboard to create a chart of NYCHA's Top Sites of Focus that lists developments with the most outages (an example is shown below). These charts are updated every week and, during its summer meetings, HMSD reviews them and considers the appropriate tactics at each site to address its unique heating challenges. This may include repairing or replacing a condensate tank that malfunctioned or is otherwise inoperable, or addressing staffing issues that affect responses to outages. Steam leaks, inoperable zone valves and hydronic distribution system leaks are also common issues at many of the developments on the Top Sites list. Because other leaders from the Operations Division attend the weekly meetings, along with the Monitor team, EHS and HUD, the discussions that occur for these site-specific issues are geared towards thoroughly understanding the problems and finding solutions. Steam leaks are always a main discussion point because they are an especially serious problem at

⁶ Tank rooms located in every building contain equipment that delivers both heat and hot water throughout the building. Tank rooms receive steam or heated water (depending on the type of heating system) from pipes that run from the development's boiler room.

NYCHA. When they are not repaired, over time they become larger and more debilitating to the system’s ability to transport heat between and among various development buildings. NYCHA presently assesses that it has over \$20 million in steam leak repairs to make, \$10 million of which it can currently fund.

Top Sites of Focus for 2022-2023 Heating Season

Locations with Most Unplanned Heat Outages (October 1, 2022 to May 31, 2023)

Development	Heat Outages	2023 Heating Readiness Tactics and Operational Investments Strategy
SAMUEL (CITY)	10	Completed: \$1.9M Hot Water Heater and Tank Replacement
RED HOOK EAST and WEST	10	Outages were related to Mobile Issues. HMSD working to have high pressure plant turned over
BARUCH	9	\$1.7M – Steam line replacement, Vacuum Tanks, Hot Water units.
VAN DYKE	9	\$196K – Vacuum and Condensate Tanks / Outages related to mobiles (A & CM working on installing gas fired mobiles)
LINCOLN	8	Internal Plant is condemned / this site is supported by 4 mobiles
VLADECK	8	Staffing issues corrected through disciplinary action and training
RIIS	8	\$2M Zone Valves, Hot Water Units, Underground Steam Leak
MELROSE	8	Completed: Feedwater pump repairs
FORT INDEPENDENCE STREET-HEATH AVENUE	7	\$25K - for the installation of a 2 Expansion Tanks. This will reduce the impact of expansion and contraction on the distribution system
BRACETTI PLAZA	7	\$355K - Condensate Tank Replacements, Zone Valve Replacements
GRAVESEND	7	The new plant experienced repeated low gas pressure issues. HMSD recommended increasing the new boiler's gas train and gas supply piping to increase volume. A & CM completed this work as of 9/
1162-1176 WASHINGTON AVENUE	7	\$207K - Hot Water Unit, Basement Trunk Line Repairs
STRAUS	6	New regulators and gaskets were installed to address issues.
UPACA (SITE 5)	6	Repairs reported to be made for leaks.
DREW-HAMILTON	6	\$748K – Steam Leaks and Hot Water Unit Replacement
ASTORIA	6	Completed: \$18,237.55 Steam Line Vent
METRO NORTH PLAZA	6	Issues were expected to be mobile boiler issues.
MANHATTANVILLE	5	\$393K – Upgrade Time Zone Valve Panels, Condensate Tank, Feedwater Lines Completed: \$362K – Vacuum Tank Replacements
CLAREMONT PARKWAY-FRANKLIN AVENUE	5	Final sign-offs for the 3 boiler rooms completed in June 2023. Outages caused by distribution line leaks
ADAMS	5	\$20K Remove and replace and insulate 400 ft of copper from the condensate tank to boilers. Completed: \$25K – Boiler feed water line repairs
ST. MARY'S PARK	4	\$595K – Steam Line Repairs to expansion joints in a volted pit and replaced 4 Vacuum Pumps, and installtion Dewatering Sump Pumps in the volt
MARCY	4	\$920K - Underground steam leak, Vacuum Tank Replacment, Steam Line Repair

B. Key Initiatives to Further Improve the PM Program

Starting in 2022, especially with the infusion of additional resources, HMSD leadership has been able to move beyond a largely reactive response to its service outages to a more proactive strategy. HMSD has begun various significant initiatives that should improve its maintenance and repair work both for the coming heat season and for the long term, including:

- significant expansion of HMSD’s overall heat training program;
- better compliance with PM and IN WO structure to improve PM data quality;
- better use of WO data to understand, prioritize and complete CM WOs for needed repairs opened during IN inspections;
- establishing a planning unit within HMSD to better address and complete the backlog of CM WOs;
- establishing a more effective meeting structure to report on and address both PM (during the summer) and heat outage (during the winter) issues which includes HMSD, NYCHA’s Operations Division, the Monitor team, EHS and HUD;

- initiating strategies to better address apartment heating issues separate from those caused by outages, including initiating the Steam Optimization Squad (SOS) to focus on building and apartment distribution maintenance and repairs;
- better coordination with the contractor hired by HMSD to perform a portion of NYCHA's boiler overhaul which increased the number of boilers completed and improved the quality of the contractor work this past summer;
- conducting meetings with property management supervisors, including borough VPs, Neighborhood Administrators and Property Managers, as well as many resident leaders, to establish clear communication structures and working relationships as the new heating season begins; and
- obtaining \$45 million in capital funding for priority heat distribution-related projects, especially to repair leaks in steam distribution systems.

Training

One of HMSD's greatest challenges is the lack of training and heating work experience of many of its staff, especially new personnel that generally come to HMSD with very little of either. Compounding this problem is that up until earlier this year, due to the limited resources of NYCHA's Learning & Development (L&D) unit, new HMSD hires had to wait a year on average from when they started at HMSD before there was space at the L&D training center for them participate in the introductory heating training. This meant that new HPTs were on the job for many months without proper maintenance or repair work training or an understanding of NYCHA's Heat SOPs. Given HMSD's insufficient number of field managers before the recent staff increases, there was also essentially no structured field training available either for new HMSD recruits. All these factors contributed to the poor compliance of staff with heating SOPs, including WO information entry procedures or proper performance of maintenance or repair work. The Monitor team, EHS and HUD continually pointed this problem out in various reports and recommendations and pushed NYCHA to better resource HMSD to correct this.

Starting in mid-2022, NYCHA and HMSD committed to and quickly instituted several initiatives to start building a comprehensive and effective heat training program. The long-term plan is to establish a state-of-the-art Heat Training Center, which will include pieces of NYCHA's main heating equipment for staff to learn on. The center is scheduled to open the later part of next year. HMSD is already working on setting the curriculum and reaching out to some of NYCHA's best former heating staff (now retired) to come back as instructors.

NYCHA and HMSD have also taken several intermediate steps to improve training prior to the completion of the center, including: 1) transferring the responsibility for heat training directly under HMSD to implement and manage, 2) creating a condensed intensive heat training to more quickly train new staff, 3) collaborating with Monitor team public housing experts from Quadel Consulting (Quadel) on training curricula including HMSD departmental orientation training and additional training content for both HMSD managers as well as HPTs. This includes training on NYCHA's Heat SOP and use of the handheld devices that staff use in the field to enter information in NYCHA's WO system. HMSD and Quadel are also working to create quick reference guides and other teaching aids related to key portions of the Heat SOP for easier staff use in the field.

HMSD Meetings

To facilitate better internal HMSD communication and reporting as well as collaboration with the Monitor team, EHS and HUD, HMSD initiated a regular schedule of meetings in early 2022. The meetings primarily focus on heat delivery and breakdowns during the heating season and summer PM performance starting in the spring. These meetings, run by HMSD leadership, are much improved in that they are now held more frequently, are attended by HMSD's key managers, and include more performance data reporting regarding progress made and gaps that remain. As stated, to break down silos within NYCHA's Operations Division and resolve heating problems more quickly, most of these meetings are also attended by NYCHA's Chief Operating Officer and her Chief of Staff. Additionally, when discussing specific breakdowns in the field or other challenges, local managers for those sectors are expected to be well informed about the problem and the progress to date. More recently there has also been a focus on reviewing the WOs for various outages discussed to see if the information contained is complete and accurate and captures the important information necessary for a supervisor to understand both the author's assessment of the root cause as well as the actions taken to address the outage. We have seen similar types of meetings adopted in some other service areas within NYCHA, and when the meetings are properly managed as they are with HMSD, they are highly effective and result in better performance.

Improving the Quality and Use of its Data

HMSD has been working to improve the quality and use of its heating data, especially as part of its overall strategy, which began in early 2022 to revitalize its PM plan and general effectiveness in heating services delivery. NYCHA's Performance Tracking & Analytics Department (PTAD) has played a primary role in this effort, which is essential to understand and assess performance progress, better understand the gaps, and to set effective strategies for improvements. But if the data to be used is not accurate and/or complete, it is not only of limited value, but it can also create misleading results.

In 2021, HMSD worked with NYCHA's IT unit to create a WO structure to better capture key PM and equipment inspection information as part of its summer PM program. This resulted in creating a new PM and IN WO structure. Under this system, Maximo auto-generates each of these WOs for every primary piece of heating equipment, including boilers, condensate tanks, vacuum tanks, etc. As PM is performed, staff complete the corresponding PM WO for each piece of equipment to memorialize the specific maintenance done, including a description of equipment conditions. Once the PM WO is completed (and closed in Maximo), the system auto-generates an IN WO for that equipment. The Heat Superintendents are tasked with using the IN WO to inspect the equipment and identify any *unsatisfactory conditions* which then auto-generates a CM WO for the repair of that condition. The objectives are to ensure (and memorialize) that thorough PM procedures were followed and that comprehensive inspections are then done to identify all needed repairs. Since the CM WOs generated through the corresponding IN WOs are treated as *child* WOs with the IN WO, this system makes it easy to identify and track all resulting repairs needed for every inspection completed. The system was not consistently followed by HMSD for the first two years, and some sectors of HMSD were not using it at all. Both the Monitor team and EHS conducted analytics and corresponding field inspections revealing this lack of compliance and reported the findings to HMSD.

Boiler Inspections - INSBOLLER

Heatvendor	Geographical Borough	September Goal	2023				
			Total Inspections	Completed	% Complete	Remaining Inspections	% Remaining
GSH	Brooklyn	100%	14	14	100%	0	0%
	Manhattan	100%	21	20	95%	1	5%
	Queens	100%	27	27	100%	0	0%
NATGRID	Brooklyn	100%	57	57	100%	0	0%
	Queens	100%	7	7	100%	0	0%
NYCHA	Bronx	100%	157	152	97%	5	3%
	Brooklyn	100%	139	139	100%	0	0%
	Manhattan	100%	158	152	96%	6	4%
	Queens	100%	37	37	100%	0	0%
	Staten Island	100%	30	30	100%	0	0%
Grand Total			647	635	98%	12	2%

Inspection for Hydrotherm Boilers - INSHYDBLR

Heatvendor	Geographical Borough	September Goal	2023				
			Total Inspections	Completed	% Complete	Remaining Inspections	% Remaining
NYCHA	Bronx	100%	93	93	100%	0	0%
	Brooklyn	100%	278	278	100%	0	0%
	Manhattan	100%	145	135	93%	10	7%
	Queens	100%	2	2	100%	0	0%
Grand Total			518	508	98%	10	2%

HMSD creates these charts to assess the progress of the summer equipment inspections to ensure they are timely completed and that needed repairs are identified.

We saw improved staff compliance with the PM and IN WOs procedures for this past summer’s PM program. We are now seeing more complete information about the PM and inspection work done, as well as a more comprehensive list of open CM WOs for needed equipment repairs that were identified to be tracked for completion. As one example, while HMSD had only 150 CM WOs clearly identified in its tracking system a year ago, the upgraded Heat Dashboard now lists 721 of these WOs related to needed repairs identified during its equipment inspections.

Contractor Boiler Overhaul

Another important accomplishment this past summer was the better communication and collaboration between HMSD and the contractor NYCHA hired to perform a major portion of NYCHA’s summer boiler overhaul work. The effective use of the contractor to assist HMSD in completing this work requires close coordination between HMSD and the contractor work teams to share information on their schedules and progress. This includes HMSD ensuring that the specific boilers on the weekly schedules are ready for the contractor teams to work on – in other words, the boilers must be offline and emptied of water – and the contractor teams need to complete the overhaul on schedule so that HMSD Superintendents are present when the completed boilers are being “buttoned up” and ready for inspection using the IN WO.

IV. Recommendations to Further Improve the PM Program

Even with HMSD's performance improvements to both reduce outages during the heating season and better prepare for the next season with their summer PM program, residents continue to face too many heat outages, including frequent loss of hot water. Additionally, even in the absence of wide-ranging outages, a significant number of NYCHA apartments rarely receive sufficient heat during cold weather due to leaks and/or blockages in building distribution piping that chronically restrict heat delivery. As these systems continue to age and deteriorate, the problems only increase. Despite continual pushing from both the Monitor and HUD, NYCHA has only recently begun to focus more resources and attention on its apartment heating shortages. Below are some recommendations from the Monitor team for additional improvements, all of which are consistent with EHS findings based on their outage root cause investigations and other work.

Distribution System Failures

Development buildings' deteriorated heating distribution systems are now NYCHA's greatest challenge to its heating service delivery as most of these systems are as old as the buildings themselves. The first indications that these systems are degrading are generally uneven heat distribution, as leaks and blockages begin to reduce heat delivery to affected building sections and/or apartments, which is now common in many NYCHA buildings. We have seen that heat distribution failures have become worse every year of the monitorship. These distribution failures can be so extensive within some individual buildings that they are now the main cause for their heat outages as multiple apartments can be affected from a single major distribution system break occurrence.

For example, last December there was a full building outage at a Bronx development that resulted in almost three days of very cold temperatures. The system was so old and deteriorated that as quickly as HMSD repair teams could fix the leaks in one section of the piping, more developed in other parts, and the entire building distribution system had to remain shut down until the weather warmed and the leaks subsided. While HMSD performed some more extensive remedial repair and equipment installation work at the end of the heating season, which will hopefully avoid a repeat this winter, this is only a short term solution until the entire system can be replaced. These occurrences of system-wide distribution breakdown are beginning to increase at NYCHA.

Even in the absence of full-system breakdowns, NYCHA's heat data reveals the additional extensive problem of individual apartments and even whole building sections that chronically do not receive sufficient heat during cold weather. Through both field inspections and resident interviews, we have also found conditions within individual apartments where certain rooms (often bedrooms that border exterior building walls) generally receive insufficient heat while other rooms in the same apartment do.

The measures required to address both full-system and the lesser sectional distribution problems are expensive, time-consuming to complete, and disruptive for residents. While A&CM working with HMSD have increased their efforts to identify NYCHA buildings most in need of distribution system replacements, they are still rarely being included as part of its heating system capital projects. As we have previously reported, while NYCHA currently lacks all the capital funds needed to replace its worst heating distribution

systems, it should at least complete the process of comprehensively identifying those sites most at risk of substantial system failures and what it will take both for the short and long terms to keep them operational.

HMSD and NYCHA have only recently begun to provide more resources and greater focus on their individual apartment heating problems (not part of outages). These efforts include increasing HMSD's HPT and maintenance workers so there are more staff resources, better training of staff in proper apartment maintenance – especially for radiators – including the new SOS training, improvement of the oversight and tracking of apartment heating maintenance work to ensure it is being done, and improving the quality of heat WO data related to apartment heating shortages. As stated above, HMSD has also recently initiated closer interactions with property management to get their cooperation and participation in improving heat in development buildings, including apartments. This includes providing air conditioner sleeves and other types of insulation materials, and otherwise working with residents on steps they can take to reduce drafts in their apartments during the winter.

These measures are still being developed and must be better resourced and expanded to truly be effective. The SOS training is an effective structure and operates like a SWAT team to address critical building and apartment distribution problems and PM, but it is currently understaffed and lacks an adequate supply of replacement parts. HMSD has brought back use of the 'peppermint' test to detect heat piping leaks so they can be repaired before the heating season begins, but HMSD has yet to establish a separate WO so that staff can enter relevant information into Maximo and managers can assess whether all the tests are being properly completed.⁷ Additionally, HMSD should work with NYCHA IT to establish a comprehensive WO system for annual apartment PM work to track whether this work is being completed in every apartment and gather more information regarding apartment radiator conditions and their repair needs. Performing more annual apartment heat PM visits also affords HMSD staff an opportunity to answer resident questions regarding their heating issues and provide greater guidance on what they can do to reduce heat loss.

Improving the Quality of Heat Data

The value of data analytics, whether at NYCHA or for any organization, is only as useful as the quality of the data itself. Having comprehensive analytics is essential for NYCHA, not only to understand and assess its performance levels and trends, but also to show compliance with the Agreement as many of its requirements concern various performance metrics NYCHA is obligated to meet. While progress has been made, challenges remain to create structures to support and ensure that staff, both supervisors and HPTs, are following established WO procedures and inputting the proper information. Over the last two years, both the Monitor team and NYCHA's IT unit have collaborated in conducting various analytics on heat WO compliance and provided the results to HMSD. To date, the focus has mainly been on NOHEAT WO submissions (staff responses to apartment heat complaints from residents) and whether resulting WOs include the proper temperature readings. Initially, a significant number of these WOs had incomplete information – almost

⁷ This test involves staff placing peppermint oil into the building's distribution piping and then working with staff and residents to locate any areas throughout the building where the smell of peppermint can be detected to identify leak locations.

a third. While compliance is improving, it has been slow, and it must continue to improve if HMSD is to have more complete information regarding its apartment heat shortages.

Since the monitorship began, the Monitor team has been analyzing NYCHA heat outage data to assess their root causes. This information is important to understanding: (i) which equipment needs additional PM and/or full replacements; (ii) staff needs for specific training; (iii) identification of buildings with significant distribution system failings; and (iv) assessment of staff performance regarding their overall maintenance and repair work. The Monitor team and PTAD have been providing HMSD with this information along with our assessment that much of the WO heat data is lacking in both accuracy and completeness. As we discussed above, equipment failure codes entered into WOs are still not being properly selected and descriptions in WO work logs of conditions found and work performed are often incomplete or missing altogether. The work HMSD is now doing with NYCHA IT to revise and simplify outage and repair codes should greatly improve data quality when this work is done.

Better Coordination between HMSD and Local Property Management Staff

Better coordination and communication between HMSD and property management development staff is essential so that local property managers and development superintendents are kept abreast of critical heating information and events occurring in the winter. Property management should be provided with timely, clear, and detailed information regarding all service disruptions, including the steps being taken by HMSD to correct them. This will enable local property management managers to keep their staff, residents and resident leaders properly apprised of these disruptions and reliable forecasts for their corrections. On the flip side, property management must perform their assigned tasks that affect heating services and heating plant conditions at their sites. This includes regular inspections and maintenance of building house pumps (which receive water stored in the building roof tanks and distribute it to the building, including to the building's boilers) and basement sump pumps and drains (which are needed to remove water from heating plants when floods occur). Property management also plays an important role in working with residents to make sure measures are taken to eliminate drafts in their units, including addressing leaking windows and providing air conditioner covers in the winter. Establishing clearer structures for more effective interactions between HMSD staff and their property management counterparts should be prioritized this year.

Continue to Improve Staff Management, including HPTs

In our heating plant field inspections and related conversations with staff, the Monitor team continues to find that certain procedures found in the Heat SOP are not being consistently followed. This includes procedures such as making proper information entries in boiler room logbooks, performing the regular daily, weekly and monthly schedules for heating equipment maintenance during the winter, and compliance with staff WO submissions as discussed above. While the recent increase in HMSD management staff and increased training are gradually improving compliance, we still see areas where staff are not following established SOPs, especially for certain important maintenance procedures.

An example has to do with the proper treatment of the water being used in conventional heating systems at NYCHA. While boilers and other heating equipment will operate with untreated (raw) water, it will more quickly age the equipment, as untreated water is very damaging to the equipment's metal surfaces. Also, unheated water directly placed into an operating boiler will have a similar effect as the interaction of cold water with hot metal heating equipment surfaces weakens the metal over time. During many of our heating plant inspections we have observed numerous inoperable or severely deteriorated condensate tanks and other clear indications that water was not being properly treated or prepared before use in the boiler systems. On-site heating staff interviews on this topic sometimes revealed that they do not know how to properly treat the water or why it was an important aspect of proper boiler operations.

Conclusion

With fewer equipment breakdowns and service outages to respond to, and the infusion of additional staffing resources and other funding provided for projects such as the new Heat Lab, HMSD must leverage these gains and continue to think and operate more strategically to remain on their trend of improving performance. The strategy should include both continuing the focus on fundamental HMSD activities - especially staff training and management, data quality and the greater use of its data to drive decisions – and looking at new heating technology to improve their heating services. For example, NYCHA has been looking at and is now piloting state-of-the-art in-unit installed heating/cooling systems that operate on electricity that would forego the need for boiler rooms and the distribution systems needed to bring heat from boilers to the apartments. This kind of approach, which combines the talents of HMSD, A&CM and NYCHA's sustainability group (within A&CM) are essential collaborations to both address NYCHA's impending heat distribution system crisis as well as improving overall heating services and energy efficiency. An additional fundamental component for HMSD's operational success also lies with continuing to foster a culture of accountability among staff to both know what their jobs are and then take responsibility to see that they are properly completed. This effort to promote greater accountability is as essential as any of the other measures HMSD is working to advance to improve their heating services.