



U.S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF INSPECTOR GENERAL

*Ensuring clean and safe water
Compliance with the law*

Management Weaknesses Delayed Response to Flint Water Crisis

Report No. 18-P-0221

July 19, 2018



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Abbreviations

CCT	Corrosion Control Treatment
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FY	Fiscal Year
GAO	U.S. Government Accountability Office
LCR	Lead and Copper Rule
MDEQ	Michigan Department of Environmental Quality
OECA	Office of Enforcement and Compliance Assurance
OIG	Office of Inspector General
OW	Office of Water
ppb	parts per billion
PQL	Practical Quantitation Limit
PWSS	Public Water System Supervision
SDWA	Safe Drinking Water Act

Cover Photo: EPA Region 5 emergency response vehicle in Flint, Michigan. (EPA photo)

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At a Glance

Why We Did This Project

The U.S. Environmental Protection Agency's (EPA's) Office of Inspector General (OIG) conducted this audit to examine the circumstances of, and the EPA's response to, contamination in the city of Flint, Michigan's community water system, including the EPA's exercise of its oversight authority. After Flint switched its drinking water supply in April 2014, inadequate water treatment exposed many Flint residents to lead.

In October 2016, the OIG issued a Management Alert to the EPA about specific factors that delayed its emergency response. Our current report evaluates additional matters concerning the agency's management controls when responding to the Flint contamination incident.

According to the MDEQ, more than \$400 million in public funds has been spent by the EPA and Michigan to address the Flint crisis. Eight other federal agencies also provided support.

This report addresses the following:

- *Ensuring clean and safe water.*
- *Compliance with the law.*

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Management Weaknesses Delayed Response to Flint Water Crisis

What We Found

The circumstances and response to Flint's drinking water contamination involved implementation and oversight lapses at the EPA, the state of Michigan, the Michigan Department of Environmental Quality (MDEQ), and the city of Flint. Since January 21, 2016, the EPA has overseen the implementation of its emergency administrative order and amendment issued in response to the drinking water contamination. EPA Region 5 and EPA headquarters officials have worked with the MDEQ and Flint personnel to help improve the city's water system. As of May 2018, the state of Michigan and city of Flint have completed some actions and are working on remaining actions.

The EPA should strengthen its oversight of state drinking water programs to improve the efficiency and effectiveness of the agency's response to drinking water contamination emergencies.

Michigan: Under the MDEQ's supervision, the Flint water system did not adhere to two Lead and Copper Rule requirements: (1) develop and maintain an inventory of lead service lines needed for sampling, and (2) maintain corrosion control treatment after the water source switch in April 2014. The rule requires utilities to minimize consumers' exposure to lead in drinking water. As the primacy agency, the MDEQ is responsible for enforcing this rule for Michigan water systems. The MDEQ did not issue a notice of violation or take other formal enforcement action regarding either requirement until August 2015. Instead, the MDEQ advised Flint public water system staff to conduct additional tests and to delay corrosion control treatment installation. The decision to delay corrosion control treatment prolonged residents' exposure to lead.

The EPA: The agency retains oversight and enforcement authorities to provide assurance that states with primacy comply with Safe Drinking Water Act requirements, such as those in the Lead and Copper Rule. However, Region 5 did not implement management controls that could have facilitated more informed and proactive decision-making when Flint and the MDEQ did not properly implement the Lead and Copper Rule. While Flint residents were being exposed to lead in drinking water, the federal response was delayed, in part, because the EPA did not establish clear roles and responsibilities, risk assessment procedures, effective communication and proactive oversight tools.

Recommendations and Planned Agency Corrective Actions

We recommend that EPA headquarters and EPA Region 5 use lessons learned from Flint to improve its oversight of Safe Drinking Water Act compliance. We also recommend that EPA headquarters revise the Lead and Copper Rule to improve the effectiveness of monitoring requirements. The EPA agreed with eight of the nine recommendations and provided adequate planned corrective actions and completion dates. Eight recommendations are resolved pending completion of corrective actions. Recommendation 1 is unresolved.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

July 19, 2018

MEMORANDUM

SUBJECT: Management Weaknesses Delayed Response to Flint Water Crisis
Report No. 18-P-0221

FROM: Arthur A. Elkins Jr.

A handwritten signature in black ink, appearing to read "Arthur A. Elkins Jr.", is placed next to the name in the "FROM:" field.

TO: Susan Bodine, Assistant Administrator
Office of Enforcement and Compliance Assurance

David P. Ross, Assistant Administrator
Office of Water

Cathy Stepp, Regional Administrator
Region 5

This is our report on the subject audit conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). The project number for this audit was OPE-FY16-0031. This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established audit resolution procedures.

The EPA offices responsible for responding to issues in this report are the Office of Enforcement and Compliance Assurance; the Office of Water; and the Office of the Regional Administrator, Region 5.

Action Required

This report contains one unresolved recommendation. In accordance with EPA Manual 2750, the resolution process begins immediately with the issuance of this report. We are requesting a meeting within 30 days between the Assistant Administrator for Water and the OIG's Assistant Inspector General for Audit and Evaluation. If resolution is still not reached, the Office of Water is required to complete and submit a dispute resolution request to the Chief Financial Officer to continue resolution.

We will post this report to our website at www.epa.gov/oig.

Table of Contents

Chapters

1	Introduction	1
	Purpose	1
	Background.....	1
	Responsible Offices	11
	Prior Reports.....	11
	Scope and Methodology	11
2	Circumstances Leading to Flint Drinking Water Contamination and EPA Emergency Administrative Order.....	13
	Inventory of Required Tier 1 Locations Was Not Maintained	13
	Corrosion Control Treatment Was Not Maintained	13
	Conclusion	15
	Recommendations	15
	Agency Response and OIG Evaluation.....	15
3	EPA Region 5's Management Weaknesses Delayed Federal Intervention.....	17
	Region 5 and MDEQ Did Not Establish Clear Oversight Roles and Responsibilities.....	17
	EPA and MDEQ Did Not Communicate Effectively	19
	Region 5 Did Not Have an Effective System for Risk Assessment	21
	Region 5 Did Not Use Oversight and Monitoring Authorities and Tools to Influence MDEQ.....	24
	Conclusion	27
	Recommendations	27
	Agency Response and OIG Evaluation	28
	Status of Recommendations and Potential Monetary Benefits	30

Appendices

A	Timeline of Key Events	32
B	Status of Emergency Administrative Order and Amendment	38
C	Agency Comments and OIG Evaluation.....	50
D	Distribution.....	69

Chapter 1

Introduction

Purpose

The U.S. Environmental Protection Agency's (EPA's) Office of Inspector General (OIG) conducted this review to examine the circumstances of, and the EPA's response to, the contamination in the city of Flint, Michigan's community water system,¹ including the EPA's exercise of its oversight authority.

EPA OIG Report No. [17-P-0004](#), *Management Alert: Drinking Water Contamination in Flint, Michigan, Demonstrates a Need to Clarify EPA Authority to Issue Emergency Orders to Protect the Public*, issued October 20, 2016, alerted the EPA about specific factors that delayed its response. Our current report evaluates management controls at EPA Region 5 (responsible for Michigan), and EPA headquarters' response to the Flint contamination incident.

Background

Drinking Water Contamination in Flint, Michigan



Flint Water Treatment Plant sign. (EPA OIG photo)

In April 2014, Flint's water system, serving drinking water to a population of nearly 100,000 residents, switched from purchasing treated water from the Detroit Water and Sewerage Department (now called Great Lakes Water Authority) to sourcing and treating its own water supply from the Flint River. Governor-appointed emergency managers charged with improving Flint's finances initially opposed this change, but ultimately implemented it as a cost-saving measure.

Since 1967, the Flint drinking water plant had only distributed drinking water purchased from Detroit. Flint emergency managers considered the use of the Flint River to be temporary. They planned to purchase water from a new utility, the Karegnondi Water Authority, starting in 2016.

Detroit's water system included an additive that coated pipes to prevent corrosion. The city of Flint's process for treating water from the new source did not include

¹ The Safe Drinking Water Act and its regulations classifies Flint's public water system as a large community drinking water system, hereafter referred to as the Flint "water system."

treatment for reducing corrosion. Without this treatment, lead from components within the distribution system can leach into drinking water.

After the April 2014 source switch, consumers began complaining about water quality issues. In August 2014, EPA Safe Drinking Water Act (SDWA) data showed the city of Flint violated regulations for total coliform (bacteria), and in December 2014, total trihalomethanes (a byproduct of the disinfection process). In February 2015, citizens started reporting concerns about lead contamination to EPA Region 5.

Appendix A contains a detailed timeline of events associated with the Flint drinking water incident.

SDWA and State Primacy

The SDWA, 42 U.S.C. § 300f et seq., is the federal law that protects public drinking water supplies throughout the nation. The law assigns the EPA Administrator the ultimate authority to protect public health by setting and enforcing drinking water quality standards. However, the SDWA allows the EPA to grant states the authority to implement and enforce SDWA regulations in an arrangement referred to as “primacy.”

To receive EPA approval for primacy, states must demonstrate that they have adopted regulations that are at least as stringent as national requirements, are implementing adequate procedures for the enforcement of these regulations, and will keep records and make reports as the EPA may require. The EPA has granted nearly all states—including Michigan—primacy to implement the SDWA.² When states are granted primacy, the EPA retains the responsibility for overseeing state implementation and federal enforcement authority. In 1978, the EPA determined that Michigan met all SDWA requirements to be granted primacy, including adopting and implementing enforcement procedures.



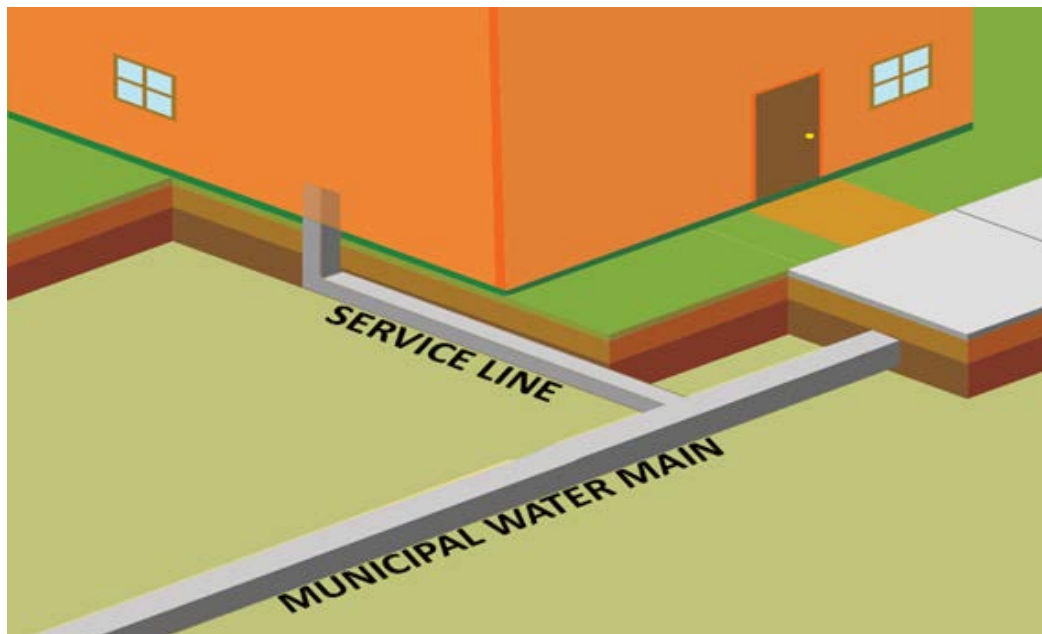
Sign directing residents to water distribution center during response efforts. (EPA photo)

Guidance from the EPA’s Office of Enforcement and Compliance Assurance (OECA) instructs EPA regional offices to “ensure that primacy agencies fulfill the enforcement conditions of their primacy agreements.”³ The EPA uses a variety of tools to oversee state drinking water implementation, such as providing technical assistance and regularly conferring with state agencies. Specifically, the SDWA authorizes the EPA to request information, take independent enforcement actions, and revoke state primacy when states do not implement the SDWA with the stringency required by federal law.

² The state of Wyoming, Washington, D.C., and most tribes are not authorized to implement the SDWA.

³ OECA National Program Manager Guidance for fiscal years (FYs) 2016–2017.

Figure 1: Diagram of a distribution system showing a service line and water main



Source: An EPA OIG image.

Lead Contamination and SDWA

Drinking water distribution systems include water main pipes and service line pipes (Figure 1). These systems may contain lead or copper components. Drinking water leaving a treatment plant may be generally free of lead, but the water can corrode pipes in the distribution system and plumbing materials in homes, and release lead into drinking water. For additional information, see the EPA's "[Sources of Lead in Drinking Water](#)" factsheet.

In children, exposure to lead can cause serious health problems, including the potential for developmental disorders, lower IQs and delinquent behavior. In adults, lead exposure may result in poor pregnancy outcomes, dementia and cardiovascular disease.

In 1991, the EPA issued the Lead and Copper Rule (LCR), 40 CFR § 141.80 et seq., to minimize lead and copper in

Reduce Your Exposure to Lead in Drinking Water at Home

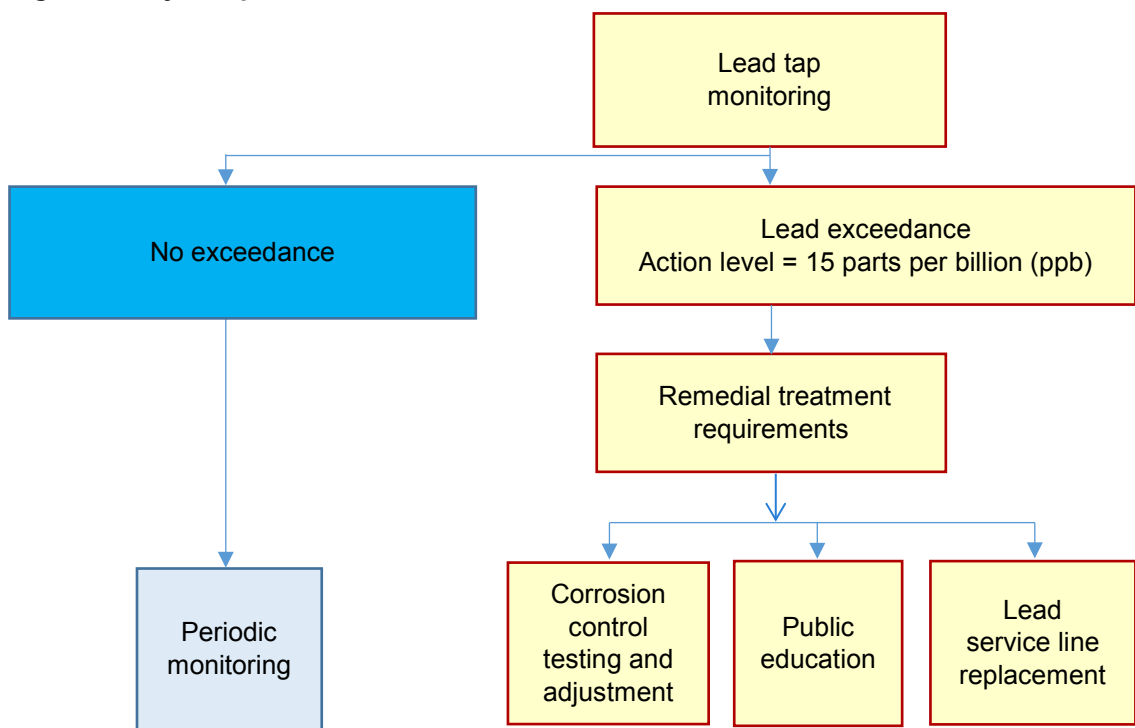
- Use only cold water for drinking, cooking and making baby formula. Boiling water does not remove lead from water.
- Regularly clean your faucet's screen (also known as an aerator).
- Consider using a water filter certified to remove lead and know when it is time to replace the filter.
- Before drinking, flush your pipes by running your tap, taking a shower, doing laundry or a load of dishes.

Source: The EPA's [Basic Information About Lead in Drinking Water](#) webpage.

drinking water.⁴ Lead and copper are only two of over 90 contaminants regulated under the SDWA. The National Primary Drinking Water Regulations establish either a maximum contaminant level (a health-based standard), or a treatment technique requirement.

There is no safe level of lead in drinking water. However, the LCR established the treatment technique requirements to minimize exposure. These requirements compel drinking water systems to conduct tap sampling for lead and copper to determine the treatment techniques and other steps systems must take to reduce exposure. To adhere to the LCR, utilities must conduct monitoring for lead and copper in water systems, and demonstrate that they comply with monitoring and treatment technique requirements.⁵ Figure 2 illustrates key components of the LCR relevant to the city of Flint.

Figure 2: Key components of the LCR relevant to Flint



Source: An EPA diagram modified by the OIG. The red outline boxes are discussed in sections below.

⁴ Some LCR requirements vary based on the water system size and type. Since Flint is a large community system, this report discusses the requirements for large community systems—those serving more than 50,000.

⁵ In 1986, Congress amended the SDWA to prohibit the use of pipes, solder or flux that are not “lead free” in public water systems, or in plumbing where facilities provide water for human consumption. In 1996, Congress further amended the SDWA by prohibiting the sale of any pipe or plumbing fixture that was not lead free, except for a pipe used in manufacturing or industrial processing. In 2000, the EPA published revisions to the LCR to address implementation issues arising from legal challenges to the 1991 rule. The revisions also streamlined and reduced the monitoring and reporting burden. In 2007, the EPA revised the LCR to enhance implementation in the areas of monitoring, treatment, customer awareness and lead service line replacement.

Treatment Technique Requirements: Corrosion Control (40 CFR § 141.81 and § 141.82)

The LCR requires community water systems to optimize corrosion control. Utilities have optimized corrosion control when the treatment method that they use has minimized the potential for corrosion in the distribution system, thus minimizing lead contamination. The rule does not prescribe specific corrosion control treatments. Instead, there is a range of methods that water systems can use.

When the LCR was implemented in 1991, it established timelines for the installation of corrosion control treatment and for subsequent monitoring. The LCR required large water systems to install optimal corrosion control treatment by January 1, 1997, unless they qualified for certain exemptions.⁶

One exemption was to demonstrate low lead levels at consumers' taps, where water systems monitor drinking water over two consecutive 6-month periods. Water systems were required to show whether lead concentrations fell at or below 5 ppb (the PQL) between the entrance to the distribution system and consumers' taps. If results exceeded 5 ppb, water systems were required to establish and optimize corrosion control treatment.

LCR Terms

Action level of 15 ppb: Utilities are required to monitor so that lead concentrations in the 90th percentile do not exceed the *federal action level* of 15 ppb.

Water quality parameters: State-approved measures that are used to determine whether corrosion control is working within the distribution system.

Practical Quantitation Limit (PQL) of 5 ppb: Level of lead concentration in a large system where the LCR required optimal corrosion control treatment.



Drinking water samples taken from Flint residences during the emergency response. (EPA OIG photo, taken April 2016)

According to the LCR, if a water system has optimized its corrosion control treatment and plans to change water sources or drinking water treatment methods, the state must review and approve plans before the change can be implemented.

The LCR requires states to review and approve the optimized corrosion control treatment for all systems. The LCR also requires states to designate optimal water quality parameters intended to represent the conditions under which systems must operate their corrosion control treatment. The rule requires that

⁶ The exemption criteria are specified in 40 CFR § 141.81(b)(2)-(b)(3).

water systems measure against those parameters, which are typically set as ranges or minimums. Without set water quality parameters, a state does not have a reliable method for gauging the adequacy of corrosion control treatment or determining compliance.

The LCR allows the EPA to intervene if a state fails to approve appropriate treatment plans. The rule authorizes EPA regional administrators to review state treatment determinations and issue alternate federal determinations, if the EPA finds the following:

- A state has failed to issue a treatment determination by the applicable deadlines,
- A state has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or
- The technical aspects of a state's determination would be indefensible in an expected federal enforcement action taken against a system.⁷

Tap Water Monitoring for Lead (40 CFR § 141.86)

After a system has optimized corrosion control, the LCR requires water systems to monitor for changes in lead concentration on a regular basis. These



Lead service lines showing inner surface without any coating from corrosion control treatment (left), with coating (right), and fully corroded (middle). (EPA photo)

tests verify that when drinking water reaches the consumer, lead concentrations do not exceed the federal action level of 15 ppb in more than 10 percent of homes.⁸

To conduct the monitoring, the LCR requires utilities to identify the highest-priority sampling sites, such as single-family homes served by lead service lines. The highest-priority sampling sites are identified as “tier 1” locations and, for Flint, constitute the entire sampling pool for regular testing.

The LCR instructs water systems to regularly report tap water sample results from tier 1 sites. Water systems monitor tap water on a semiannual, annual or triennial basis to verify lead contamination does not exceed the federal action level. When a large water system exceeds that level in more than 10 percent of home tap water samples, the water system must provide public education on

⁷ 40 CFR § 142.19 provides the procedures for the EPA Administrator's review of state determinations and issuance of a federal order.

⁸ 40 CFR § 141.80(c)(1) describes this as the “90th percentile” lead level exceeding 0.015 milligrams per liter.

lead, remove a percentage of lead service lines, and conduct source water monitoring.

Public Education (40 CFR § 141.85)

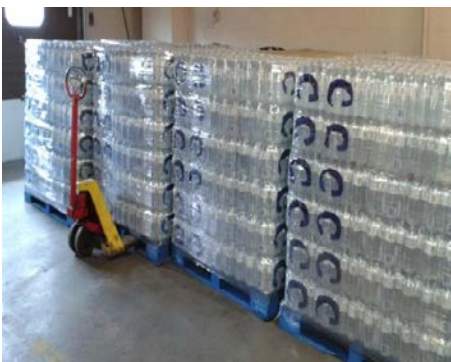
The LCR requires systemwide public education when tap-monitoring results show that a system exceeds the federal action level for lead. There are also supplemental lead-monitoring requirements for all water systems to provide consumer notices to those whose taps were tested. The purpose of public education is to inform consumers about lead results, the health effects of lead, and steps the public can take to reduce exposure.

Water systems must submit all written public education materials to the state prior to releasing the information to the public.

Lead Service Line Replacement (40 CFR § 141.84)

In the event of a lead action level exceedance, the LCR requires water systems to identify the number of lead service lines present in the distribution system, and requires water systems to meet the minimum 7 percent replacement rate through either physically replacing lead service lines or individually testing them to demonstrate their lead concentrations are below 15 ppb. However, if the system returns to a lead level below the action level after two monitoring periods, the utility is not required to continue removing lead service lines. In addition, if a system is in violation of 40 CFR § 141.81 for failure to install corrosion control treatment, the state can require the system to commence lead service line replacement until the system is below the lead action level for two consecutive monitoring periods.

Emergency Administrative Order and Amendment



A bottled water distribution site in Flint.
(EPA OIG photo, taken April 2016)

On January 21, 2016, OECA issued an [Emergency Administrative Order](#) requiring the state of Michigan, the Michigan Department of Environmental Quality (MDEQ), and the city of Flint to take steps to reduce lead contamination.

EPA managers monitoring compliance with the order determined that while the state of Michigan, the MDEQ, and the city of Flint made a good-faith effort to comply, the EPA did not see progress in completing some of the required actions. In November 2016, EPA Region 5 issued its [First Amendment to Emergency Administrative Order](#). The amendment set new goals and allowed the city to develop milestones it could achieve.

Subsequently, OECA and EPA Region 5 have overseen the respondents' compliance with both the order and the amendment to the order (Appendix B). According to Region 5, the EPA worked with the city and the MDEQ to do the following:

- Oversee treatment plant operations.
- Provide outreach to impacted residents.
- Mobilize the largest sampling effort in EPA history.
- Address technical problems through a cross-agency expert task force.
- Hold open-house information sessions for residents.
- Hold science summits with federal, state and local scientists and experts.

The EPA maintains a list of activities and progress updates for the order and its amendment on the agency's [Flint Drinking Water Documents](#) webpage. The MDEQ reported that by December 2017, lead levels in Flint's drinking water had fallen below the federal action level of 15 ppb. However, the EPA and local authorities continued to recommend that residents filter their water for drinking and cooking. As of May 2018, the state of Michigan and the city of Flint have not completed all actions in the order and amendment.

Please see Appendix B for status of order and amendment actions.

Currently, the city and state are working to replace lead service lines.

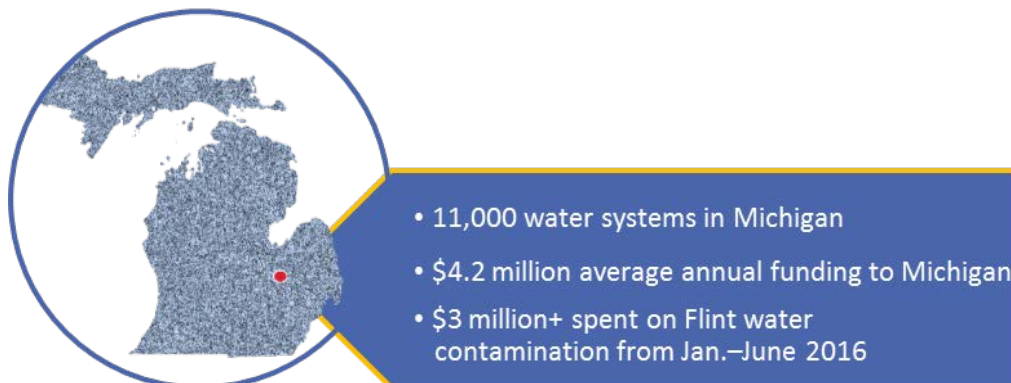


A billboard in the city of Flint. (EPA OIG photo, taken April 2016)

Through its Public Water System Supervision (PWSS) program, the EPA awarded Michigan an average of \$4.2 million annually to fund over 11,000 water systems in the state.⁹ According to the EPA, as of June 2016, the agency spent more than half of that amount (over \$3 million) on the Flint drinking water contamination incident in the first 6 months after the order was issued (Figure 3). The state of Michigan provided approximately \$250 million to address problems in Flint's water system, and to increase the city's technical and managerial capacity.

⁹ Average of funding awards in FYs 2011–2016.

Figure 3: Comparison of Michigan's statewide water system funding and Flint contamination spending



Source: An EPA OIG image.

In March 2017, the EPA awarded an additional \$100 million¹⁰ to the MDEQ for Flint water infrastructure upgrades, which required a state match of 20 percent or \$20 million. In September 2017, the MDEQ reported that combined federal and state spending to address the contamination totaled more than \$400 million.¹¹

Challenges with the LCR



An EPA employee collects a water sample to send to a laboratory for analysis during response efforts. (EPA photo)

Assuring public health under the LCR presents challenges. A key challenge is that the LCR is based on treatment, not health-based requirements. The EPA has recognized the need to clarify and strengthen the rule, and the agency is in the process of revising it.

In October 2016, the EPA's Office of Water released the [*Lead and Copper Rule Revisions White Paper*](#) for the purpose of keeping the public informed about options being considered by the agency. The report suggests that proposed revisions to the rule should include technology-driven and health-based elements to avoid high lead levels and health risks. Some of the elements under consideration include the following:

- Incorporating health-based goals for lead to guide actions and communicate risk at the household level.

¹⁰ EPA press release: [EPA Awards \\$100 Million to Michigan for Flint Water Infrastructure Upgrades](#) (March 17, 2017).

¹¹ In addition to the EPA, other federal agencies also provided support and funding.

- Implementing and enforcing the mechanism for lead service line removal programs.
- Requiring all systems to implement corrosion control treatment, regardless of system size, tap sampling results, or presence of lead service lines.
- Using “point of use” filters when addressing risks from lead and copper at the household level.
- Clarifying and strengthening sampling requirements, reducing uncertainty, and ensuring broader and more consistent proactive application of corrosion control treatment.
- Increasing the transparency associated with implementing the LCR by publicly posting the locations of lead service lines and sampling results.
- Strengthening public education requirements in the LCR.

Management Controls for Government Programs

All federal agencies must establish certain standards, policies and practices to create a sound internal control structure for their programs. Internal controls help to prevent and detect errors, fraud and noncompliance with provisions of laws and regulations. Agencies and individual federal managers are required to develop internal controls for programs to achieve results and comply with applicable laws and regulations.

The U.S. Government Accountability Office (GAO) developed internal control standards in 1999 (revised in 2014) to assist agencies in achieving their objectives. The standards focus on effective internal control through communication, risk assessment and oversight. The EPA instructed managers to use these standards in the agency’s EPA Order, *Management’s Responsibility for Internal Control* (2008).

Likewise, the EPA’s *FY 2017 Guidance for Enterprise Risk-Based Decision Making at EPA: Integrating Strategic Reviews and Management Integrity Internal Controls* incorporates GAO guidelines and tools to integrate risk assessment into the strategic planning process.

Responsible Offices

EPA Region 5 drinking water program staff and managers primarily oversee SDWA implementation in regional primacy states, including Michigan. Two headquarters offices help EPA regions implement the SDWA:

- The Office of Water (OW) provides programmatic and implementation guidance.
- The Office of Enforcement and Compliance Assurance (OECA) advises EPA regions about enforcing SDWA provisions.

Prior Reports

EPA OIG Report No. [17-P-0004](#), titled *Management Alert: Drinking Water Contamination in Flint, Michigan, Demonstrates a Need to Clarify EPA Authority to Issue Emergency Orders to Protect the Public*, was issued October 20, 2016. The report noted that the EPA needs to clarify for its employees how its emergency authority can and should be used to intervene in a public health threat. The OIG recommended that OECA update the EPA's 1991 guidance on SDWA § 1431 emergency authority. We also recommended that OECA require all relevant EPA drinking water, and water enforcement program management and staff, attend training on SDWA § 1431 authority. The agency agreed with the recommendations and corrective actions are in progress.

GAO Report No. [GAO-17-424](#), titled *Drinking Water: Additional Data and Statistical Analysis May Enhance EPA's Oversight of the Lead and Copper Rule*, is a congressionally requested report dated September 2017. The report found that available EPA data reported by states show that of the approximately 68,000 water systems subject to the LCR, at least 10 percent had at least one open violation of the rule. However, these and other data are not complete. GAO made three recommendations, including one recommendation that the EPA require states to report data on lead pipes, and develop a statistical analysis on the likelihood of LCR violations to supplement the EPA's current oversight. The EPA agreed with the GAO's recommendations.

Scope and Methodology

We conducted this performance audit from February 2016 through April 2018, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We reviewed the laws, regulations, policies, procedures and guidance related to the SDWA program. At EPA headquarters, we interviewed the former EPA Administrator; the former EPA Deputy Administrator; and staff and officials from the EPA's Office of General Counsel, the Office of Water, and the Office of Enforcement and Compliance Assurance. We also interviewed EPA Region 5 staff and officials, including the former Regional Administrator (who served until January 2016), and the former acting Regional Administrator (who served from January 2016 through January 2018). Further, we interviewed MDEQ Office of Drinking Water and Municipal Assistance personnel, former and current employees of the city of Flint, residents of Flint, and external experts. We also reviewed documents from the EPA and the MDEQ.

Chapter 2

Circumstances Leading to Flint Drinking Water Contamination and EPA Emergency Administrative Order

Under the MDEQ's oversight, the Flint water treatment plant did not adhere to two LCR requirements: (1) identify and maintain a pool of tier 1 sampling sites, and (2) install and maintain corrosion control treatment throughout the system. State and local decisions to not adhere to these LCR requirements led to the corrosion of the Flint distribution system, which exposed residents to lead in their drinking water.

Inventory of Required Tier 1 Locations Was Not Maintained

The city of Flint did not develop or maintain accurate records of lead service line locations to identify tier 1 sampling sites. Primacy states like Michigan must require water systems to collect and maintain lead service line information, in accordance with the LCR.¹² Without this information, Flint could not prioritize its sampling efforts to collect water samples where higher levels of lead contamination were most likely to occur, as required by the LCR.

The January 2016 EPA Emergency Administrative Order required Flint to provide the agency with the city's existing inventory of homes with lead service lines. When the city submitted the inventory, the EPA found that it was not complete or accurate. However, Flint did not update its inventory of lead service lines until August 2016. EPA Region 5 staff stated that other cities face similar challenges with inventories for lead service lines in their water systems. The EPA identified this as a nationwide weakness in its October 2016 *Lead and Copper Rule Revisions White Paper*.

Corrosion Control Treatment Was Not Maintained

The MDEQ did not require Flint's water system to maintain corrosion control treatment when Flint changed water sources in April 2014. According to EPA Region 5, the MDEQ concluded that Flint's change in source water would require Flint to revert to the LCR provision that required the water system to conduct tests to determine whether corrosion control treatment was necessary.¹³ To do this, MDEQ personnel instructed Flint system staff to conduct monitoring during two consecutive 6-month periods to determine whether corrosion control treatment was necessary.

¹² 40 CFR § 141.86(1); 40 CFR § 141.91.

¹³ 40 CFR § 141.81(b)(3). EPA Region 5 learned about the MDEQ's conclusion in April 2015.

EPA Region 5 disagreed with the MDEQ's interpretation. The LCR treats systems (such as Flint's) that change their source water or treatment as an existing system. As a result, Region 5 concluded that Flint's system was an existing system with a new source. Therefore, under the LCR, the city needed to maintain continuous corrosion control treatment.

In January 2015, results from Flint's first round of testing found a 90th percentile lead concentration of 6 ppb. However, the MDEQ did not instruct Flint to install corrosion control treatment (per the LCR) but instead required an additional 6-month round of sampling. In July 2015, results from the second round of 6-month tests showed 90th percentile lead concentrations had increased to 11 ppb.



Excavated lead service lines used to test water chemistry at the Flint water treatment plant. (EPA OIG photo)

At that time, EPA Region 5 and the MDEQ reached an agreement to require the Flint water system to begin corrosion control treatment as soon as possible. In August 2015, the MDEQ required Flint to select a corrosion control treatment (no later than January 2016).

In August and September 2015, a private researcher conducted testing and identified the following:

- 110 homes sampled with lead levels over 5 ppb.
- 43 homes sampled with lead levels over 15 ppb.
- 7 homes sampled with lead levels over 100 ppb.
- 1 home sampled with a lead level over 1,000 ppb.

In September 2015, a local doctor issued a study showing an increase in the blood lead levels of children living in Flint.

In October 2015, instead of installing corrosion control treatment, Flint's water system returned to purchasing drinking water from the Great Lakes Water Authority (formerly called the Detroit Water and Sewerage Department), which already included corrosion control treatment. At the time of this change, almost a year-and-a-half of exposure to improperly treated water had damaged the city's drinking water infrastructure, and lead concentrations continued to rise. In December 2015, the MDEQ reported that Flint began supplementing Detroit water with additional corrosion control treatment. However, due to the damage done to the Flint distribution system, the lead levels in drinking water did not fall below the federal action level until late 2016.

Conclusion

The MDEQ did not enforce LCR provisions that require Flint's water system to keep an accurate and complete inventory of tier 1 sample site locations, or maintain corrosion control treatment. As a primacy agency, the MDEQ bore responsibility for advising Flint's water system staff about the drinking water source change and meeting SDWA standards. However, MDEQ personnel misinterpreted the law, which led them to provide incorrect advice to Flint on corrosion control treatment requirements. This resulted in infrastructure damage and the prolonged exposure of Flint residents to lead in their drinking water.

Recommendations

We recommend that the Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water:

1. Establish controls to annually verify that states are monitoring compliance with all Lead and Copper Rule requirements, including accurately identifying tier 1 sampling sites and maintaining continuous corrosion control treatment.

We recommend that the Assistant Administrator for Water:

2. Revise the Lead and Copper Rule to improve the effectiveness of monitoring and corrosion control treatment protocols.

Agency Response and OIG Evaluation

The agency provided a coordinated response from EPA Region 5, the OW and OECA. The offices provided planned corrective actions in their response, and additional clarifications during a June 5, 2018, meeting with the OIG.

OECA and the OW agreed with Recommendation 1; however, the offices did not provide acceptable corrective actions to address the recommendation. In their original response, the offices stated that they would develop metrics related to LCR implementation and incorporate the metrics into the regional protocol for conducting annual PWSS program reviews by September 30, 2019. The two offices also would implement a national oversight approach for drinking water programs by June 30, 2019.

The EPA provided supplemental information in the June 5, 2018, meeting with the OIG. In that meeting, and in subsequent correspondence on June 13, 2018, OECA and the OW revised their response to state that they agree on the value of national oversight for compliance monitoring and enforcement of the EPA's Drinking Water Program, but they said it is vital that they evaluate and develop it in a collaborative manner with their state partners. The offices planned to work with

states to develop an approach or a pilot for implementing a national compliance monitoring and enforcement oversight program for drinking water, as appropriate, by June 2019.

The OIG does not agree that developing a pilot or approach constitutes establishing annual controls, per the recommendation language. The OIG did not accept this response as meeting the intent of Recommendation 1, and this recommendation remains unresolved.

The OW agreed with Recommendation 2. To address this recommendation, the OW will continue to evaluate input received from state, local and tribal partners, and evaluate the best available peer-reviewed science to ensure that the revised rule reflects the best ways to improve public health protection. The OW plans to complete this action by February 28, 2019. Based on the response and clarifications, the EPA provided acceptable planned corrective actions and completion dates for Recommendation 2.

Region 5, OECA and the OW provided supplemental technical comments that the OIG incorporated as appropriate. The EPA's coordinated response is found in Appendix C.

Chapter 3

EPA Region 5's Management Weaknesses Delayed Federal Intervention

The EPA retains oversight and enforcement authorities to provide assurance that primacy states comply with the SDWA. However, timely oversight interventions rely on effective management systems that govern how and when the agency should intervene. EPA Region 5 did not manage its drinking water oversight program in a way that facilitated effective oversight and timely intervention in Flint. EPA Region 5 did not:

- Establish clear roles and responsibilities with the MDEQ.
- Communicate clearly and effectively.
- Use effective risk assessment protocols.
- Proactively use available SDWA authorities and oversight tools to intervene in Michigan's drinking water program.

These weaknesses limited Region 5's ability to monitor, adapt and respond to changing situations in Michigan and the city of Flint.

Region 5 and MDEQ Did Not Establish Clear Oversight Roles and Responsibilities

The EPA retains the authority and responsibility to oversee states with primacy over their drinking water programs. The EPA is empowered and required to intervene when states do not fulfill their responsibilities. However, EPA Region 5 staff and managers did not establish clear roles and responsibilities needed to foster a constructive federal-state relationship with the MDEQ's drinking water program staff. As previously mentioned, state primacy agreements obligate states to implement the SDWA in a manner that is at least as stringent as federal requirements. Further, the EPA's National Program Manager Guidance directs EPA regions to "ensure that primacy agencies fulfill the enforcement conditions of their primacy agreements" under the SDWA.

EPA Region 5 aimed to foster a collaborative relationship with the MDEQ. The region's focus on maintaining a partnership influenced how Region 5 staff conducted oversight and enforcement in the state. In the case of the MDEQ, this partnership limited effective EPA oversight. While Region 5 needs to work with states to accomplish the mission of the agency, the region also needs to establish clear roles and responsibilities so that both the MDEQ and the region know how and when the EPA may intervene to implement and enforce the SDWA.

As a result of this relationship, Region 5 managers did not use their knowledge about the MDEQ's incomplete implementation of the SDWA when assessing the risks in Flint. For example, in 2010, an EPA contractor reviewed the MDEQ's drinking water program and identified MDEQ implementation deficiencies.¹⁴ The review noted that the MDEQ disinvested from 10 SDWA requirements, which Michigan designated as temporary and non-health related.¹⁵ However, the review concluded that the MDEQ should reconsider these disinvestments because at least one of them could impact public health. The contractor recommended that the MDEQ implement all of the SDWA requirements, as noted in the following quote:

MDEQ should reconsider the disinvestment activities. MDEQ's actions and policies should be as stringent as federally mandated rules and policies. All instances where the federal rules were not correctly implemented were treated as discrepancies.

In the 2010 report, Region 5 responded that the disinvestments were intended to be temporary and only include nonpublic-health-related primacy activities. Region 5 said these disinvestments were allowed because the region viewed these disinvestments as an "innovative way for states to continue to ensure safe drinking water is provided to the public, even as states are struggling with diminishing resources."

Despite the recommendation from the contractor, these disinvestments continued and increased to 11 by 2015. Region 5 managers told us that being informed about implementation deficiencies in advance was a "proactive" approach to oversight. They maintained that disinvestments were more administrative and generally did not have a direct public health impact.

The MDEQ continued these disinvestments through 2015, and the OIG concluded that the disinvestments did have potential public health effects. However, Region 5 did not intervene to ensure that the MDEQ's drinking water program met minimum federal standards. It was not until 2016, while under the emergency order, that the MDEQ discontinued the majority of the disinvestments.¹⁶

In 2017, Region 5 began requiring states to submit implementation plans to describe how and when they would begin implementation of any primacy activities the states could not fully implement at that time. Table 1 contains examples of MDEQ disinvestments and OIG analysis of potential effects.

¹⁴ U. S. Environmental Protection Agency Public Water System Supervision Program, [Final Report: Program Review for the Michigan Department of Environmental Quality Water Bureau](#), August 30, 2010.

¹⁵ A disinvestment is a means to temporarily forfeit oversight functions required to implement the SDWA. Due to limited resources, the MDEQ proposed, and EPA Region 5 approved, disinvestments on an annual basis.

¹⁶ In 2016, an EPA manager told us that the MDEQ continued to be disinvested in three areas noted in the 2010 review.

Table 1: Examples of MDEQ disinvestments and potential effects

SDWA requirement	Disinvestment	Potential effect
All water systems must report to the state the results of all tap samples on a defined schedule.	MDEQ would no longer issue violations for late reporting of monitoring results.	By not issuing these violations, identification of contamination could be delayed, further prolonging consumer exposure to contamination.
All systems must submit reporting forms to the state, including the location of each site and the criteria under which the site was selected for the system's sampling pool. Include an explanation of why sampling sites have changed.	MDEQ would no longer issue violations for failure to submit the LCR reporting form.	Without the LCR reporting forms, the state could not review information showing whether lead sampling met LCR requirements.
The state must require utilities to publish annual Consumer Confidence Reports with specific content requirements on a defined schedule (reports are public).	MDEQ would no longer issue violations for late reporting or insufficient content in Consumer Confidence Reports.	By not enforcing rules for Consumer Confidence Reports, the state loses a method for providing water system users complete and timely reports about their water quality.

Source: OIG analysis.

EPA and MDEQ Did Not Communicate Effectively

Communication weaknesses contributed to a delayed federal response in Flint. For effective oversight, management needs accurate and complete information, and clear communication. However, the communication between the EPA and the MDEQ did not convey key information about human health risks from lead contamination in Flint. Communication within the EPA was also problematic. These issues limited the EPA's knowledge about risks and contributed to the delayed federal response. For example:

- MDEQ personnel did not provide Region 5 with accurate information regarding corrosion control treatment. In February 2015, when EPA Region 5 staff asked about corrosion control, MDEQ personnel told them that Flint had an optimized corrosion control program in place, that the city conducted quarterly water quality parameter monitoring and did not have any unusual results, and that Flint continued to meet all applicable

plant tap standards and treatment technique requirements. However, in April 2015, the state admitted that Flint was not using corrosion control treatment and argued that it was not required. Before that admission, Region 5 personnel did not have key information needed to intervene.

- Region 5 told us that communication with the MDEQ was frequent, consistent and clear, but the MDEQ failed to take appropriate actions when Region 5 consistently identified problems. According to EPA Region 5 managers, in April 2015, the EPA voiced concerns about the lack of corrosion control treatment to the MDEQ's Water Director. Region 5 managers said that in June 2015 they advised the MDEQ that the LCR required Flint to maintain consistent corrosion control treatment. However, an MDEQ manager stated that Region 5 did not advise them to initiate corrosion control at that point.
- Region 5 stated that the length of time that it took to obtain a legal interpretation delayed formal intervention. In a July 2015 meeting, the EPA and the MDEQ disagreed over interpretations of LCR corrosion control treatment requirements in Flint. The MDEQ requested, and Region 5 program staff agreed to obtain, a legal opinion from EPA headquarters. In August 2015, Region 5 and EPA headquarters began discussing Flint compliance with the requirements and the MDEQ's interpretation of those requirements.

However, headquarters personnel stated that Region 5's characterization of the situation lacked a sense of urgency. Region 5 did not make an official request for a headquarters' opinion until September 30, 2015. Region 5 did not receive a legal opinion, but the region's request ultimately resulted in a November 2015 Office of Water memo clarifying the LCR corrosion control treatment requirements for all large water systems.

Although the memo mentioned Flint, it did not specifically address the Flint situation (see green box). For this reason, it was of limited use in dealing with the incident in Flint.

A Region 5 official expressed concern that states would not follow guidance from the memo because it lacks the authority of law. In an effort to further clarify requirements, an EPA official stated that headquarters has provided training to EPA staff with regard to the memo.

Summary of the "Lead and Copper Rule Requirements for Optimal Corrosion Control Treatment for Large Drinking Water Systems"

In this **November 2015** memo, the EPA's Office of Water acknowledged differing interpretations of the LCR. The EPA's intent was to clarify that the rule requires any large system to continuously maintain corrosion control treatment.

Region 5 Did Not Have an Effective System for Risk Assessment

EPA Region 5 did not have effective risk assessment processes that would have alerted the region to growing issues in Flint. An effective risk assessment system provides the basis for responding to threats that impact human health. While bacterial violations alone would not have signaled to the EPA that lead contamination was occurring, the combined information available to Region 5 painted a picture of a system at risk from multiple angles.

By compiling and examining these factors, Region 5's staff and managers could have intervened sooner after the source switch, as evidence of risk grew. Instead, the federal response was delayed while residents continued to be exposed to lead in their drinking water.

Risks at the State Level

In addition to the disinvestments previously mentioned, in 2016, EPA managers discovered that MDEQ personnel did not establish water quality parameters required by the LCR.¹⁷ As stated in Chapter 1, the parameters define a range of water chemistry constraints to protect infrastructure from corrosion. The LCR requires water systems to use lead tap and water quality parameter sampling results to verify corrosion control treatment programs are effective. When water samples demonstrate that a system does not meet the parameters, violations can result.



EPA staff reviewing lead sampling data in Flint during emergency response efforts. (EPA photo)

Risks at the Local Level

Despite known economic challenges in the city, EPA Region 5 staff did not identify Flint's source water switch as an event that could impact the city's ability to comply with the SDWA. Beginning in May 2014, a number of problems emerged that should have warned the agency about the risk.

¹⁷ The LCR requires that water quality parameters include measures for lead, copper, pH, alkalinity, calcium, conductivity, orthophosphate or silica, and temperature. The EPA discovered the lack of water quality parameters in Michigan during the agency-led program review of the state's drinking water program: *U.S. Environmental Protection Agency Public Water System Supervision Draft Program Review of the Michigan Department of Environmental Quality Drinking Water Program 2016*.

For example, in June 2015, an EPA Region 5 scientist drafted an interim report that outlined concerns about lead in Flint’s drinking water and the lack of corrosion control treatment. This report indicated the potential for serious human health risks and recommended potential EPA actions.



Flint Water Treatment Plant.
(EPA OIG photo, taken April 2016)

Even with this memo and other information, a senior regional official told the Regional Administrator for Region 5 that the region and state were in the process of reaching an agreement that would require Flint to implement corrosion control treatment.

According to the Regional Administrator, the problem was not presented in a way that conveyed the gravity of the situation. The Regional Administrator said that no wide-spread public health issues were apparent at the time. This delayed the EPA’s formal intervention. Table 2 shows the growing evidence of risk in Flint.

Table 2: Evidence of growing risk in Flint

May 2014	<ul style="list-style-type: none"> • EPA Region 5 learned of Flint drinking water source switch. • EPA Region 5 received first citizen complaints about drinking water quality.
August 2014	<ul style="list-style-type: none"> • First total coliform violation occurred.
December 2014	<ul style="list-style-type: none"> • First total trihalomethanes violation occurred.
February 2015	<ul style="list-style-type: none"> • EPA Region 5 learned of elevated lead level in Flint resident’s drinking water. • EPA Region 5 manager voiced concerns to colleagues that sampling protocol is biasing lead results.
March 2015	<ul style="list-style-type: none"> • Engineering firm contracted to work on the Flint water system issued report that recommends the addition of corrosion control treatment. • EPA Region 5 learned that Genesee County was investigating an increase in <i>Legionella</i> cases.
April 2015	<ul style="list-style-type: none"> • MDEQ staff member told an EPA Region 5 manager that the Flint system does not have any corrosion control treatment.

June 2015

- EPA Region 5 learned that at least four homes had lead in drinking water above the action level.
- EPA Region 5 manager shared interim report on high lead levels in Flint's drinking water with an affected resident. The report was subsequently released to the public.

Source: OIG analysis of EPA Region 5 records.

Between May 2014 and the issuance of the EPA Emergency Administrative Order in January 2016, EPA Region 5 staff received 87 citizen complaints about drinking water conditions in Flint. The complaints described distress about water quality (color and odor), more specific concerns about total trihalomethanes, total coliform and *E. coli*, *Legionella* and, ultimately, lead.

Of the complaints received before the order, 30 (34.5 percent) included concerns about lead. Even so, Region 5 staff did not identify the volume of complaints as indications of unusual problems in Flint's water system. Region 5 officials responded with form letters that recommended citizens resolve their concerns by contacting the MDEQ or Flint's water system staff. In six cases, Region 5's response came more than a year after the citizen made the complaint. In 11 cases, we found no documentation of any response.



Multilingual sign directing residents to a water distribution site in Flint. (EPA photo)

In April 2016, we interviewed a sample of the complainants. Some expressed frustration at the lack of resolution of their complaints by Region 5. Staff and managers in Region 5 did not have a system for cataloguing and responding to citizen complaints, nor did they use citizen complaints or the volume of calls as indicators of problems with Flint's water system. As a result, Region 5 could not assess the severity of the situation, and staff were not able to alert management to an emerging incident.

Region 5 staff and managers told us that these risk factors individually or taken together would not have indicated elevated lead levels. They stated, "Generally, there is little or no correlation between citizen complaints about water and lead content." Region 5 staff said residents often complain about aesthetic concerns that are unrelated to lead levels. Further, staff told us that aesthetic complaints are common, especially in under-resourced water systems like Flint's.

Region 5's comments regarding citizen complaints contradict the EPA's [*Drinking Water Action Plan*](#), which was issued in November 2016 and stresses the importance of assessing risks at the local level. Issued after the Flint crisis, the plan states that EPA staff should do the following:



Develop priority indicators to identify troubled water systems. In a world of limited oversight resources, it is critical the EPA and primacy agencies become more effective at proactively directing oversight and technical assistance resources to systems that are most likely to face problems or risks that may adversely affect public health. Indicators may also be used to identify systems that are likely to be in violation, and follow-up with the appropriate compliance assistance and enforcement response.¹⁸

Although EPA Region 5 receives drinking water complaints regularly, we believe that complaints can serve as a critical indicator of potential problems. Instead of referring complainants back to state and local officials to resolve, the region could have taken a more proactive stance. Further, the volume of complaints should have alerted Region 5 to a developing drinking water risk in Flint. A more proactive approach could have enabled the region to respond more swiftly to the contamination incident.





Region 5 Did Not Use Oversight and Monitoring Authorities and Tools to Influence MDEQ

Region 5 used several tools to oversee the MDEQ's handling of contamination in Flint. However, when those approaches did not result in swift action to protect public health, Region 5 did not employ other SDWA authorities at its disposal to require compliance in Flint. Most authorities were not used because regional managers did not recognize them or deem them appropriate. Table 3 provides examples of drinking water oversight authorities available to Region 5, and our analysis of the region's use of those authorities. Table 4 provides examples of oversight tools available to Region 5, and our analysis of the region's use of those tools.

Table 3: Region 5's available oversight authorities in Flint






Authorities	Region 5's use of authorities
Authority to negotiate resolution of grant issues or impose additional conditions (such as withholding funds) if a grantee is in noncompliance or issues cannot be resolved. <i>(Authority: SDWA § 1443; Regulation: 40 CFR § 35.115 and 2 CFR § 200.338)</i>	 Region 5 did not place additional conditions on the Michigan public water systems supervision grant, even when issues were identified.
Authority to issue an administrative order or commence a civil action when the state does not act. <i>(Authority: SDWA § 1414)</i>	 Region 5 did not use this authority.

¹⁸ EPA Drinking Water Action Plan, November 2016, page 8.

Authority to issue a federal corrosion control treatment requirement when the state does not adequately do so. <i>(Regulation: 40 CFR § 141.82)</i>	 Region 5 did not use this authority.
Emergency authority to act when a contaminant may present an "imminent and substantial endangerment" to human health, and the appropriate state and local authorities have not acted to protect public health. <i>(Authority: SDWA § 1431)</i>	 Region 5 did not use this authority; however, EPA headquarters issued an Emergency Administrative Order on January 20, 2016.
Authority to require information to determine whether a system is acting in compliance with drinking water regulations. <i>(Authority: SDWA § 1445)</i>	 Region 5 requested and received information from Michigan about corrosion control treatment and other issues.
Authority to revoke primacy if a state does not meet primary enforcement requirements. <i>(Authority: SDWA § 1413)</i>	 Region 5 did not use this authority.

Source: OIG analysis.

Table 4: Region 5's available oversight tools in Flint

Drinking water oversight tools	Region 5's use of oversight tools
Coordinate enforcement efforts. <i>(Guidance: EPA Office of Water National Program Manager Guidance)</i>	 Region 5 conducted regular meetings. It was during these meetings that the state expressed a different interpretation from Region 5 regarding the LCR.
Provide technical and scientific support. <i>(Guidance: EPA Office of Water National Program Manager Guidance)</i>	 Region 5 provided technical assistance that the state initially was reluctant to accept. According to Region 5, the MDEQ failed to take appropriate actions when the region consistently identified problems with Flint's water switch.
Receive drinking water compliance data. <i>(Guidance: EPA Office of Water National Program Manager Guidance)</i>	 Region 5 received correspondence and reports from the MDEQ, which uncovered compliance issues.
Use Drinking Water State Revolving Fund program monies in support of the PWSS program to help achieve the public health objectives of the SDWA. <i>(Authority: SDWA § 1452; Regulation: 40 CFR Part 35, Subpart L; Guidance: Drinking Water State Revolving Fund Program Guidance)</i>	 Region 5 awarded Flint a grant for infrastructure improvements after the 2016 crisis.
Conduct compliance reviews of state programs. <i>(Guidance: EPA Office of Water National Program Manager Guidance)</i>	 Region 5 conducted 2010 and 2016 reviews of the MDEQ's SDWA program.

Source: OIG analysis.

Region 5 senior officials told us that the LCR limited their ability to intervene. For example, they stated that the rule “does not require the primacy agency to notify and/or seek approval from EPA for significant changes to public water systems.” Although the LCR does not require the EPA to be notified of the changes, regional staff knew of the source switch soon after it happened. When the region was informed—a year after the switch—that Flint did not have corrosion control treatment, the region could have intervened earlier to verify the changes occurred in accordance with SDWA regulations.



EPA staff and management at the Flint Response Center at Kettering University in Flint. (EPA OIG photo, taken April 2016)

Sampling results from two 6-month tests indicated the 90th percentile of the results exceeded the 5 ppb limit at which optimized corrosion control treatment is required, and lead concentrations increased over the course of testing. According to Region 5 officials, these results did not alert the region to widespread problems in Flint’s water system. However, if the results of these tests were combined with other issues identified in Flint, this could have signaled problems in Flint’s water system and the region could have intervened more forcefully. For example, Region 5 could have done the following:

- Taken enforcement action under SDWA § 1414, which would have required Flint to install corrosion control treatment after notifying the state.
- Issued an order under SDWA § 1431 when the region had evidence there was “imminent and substantial endangerment” to human health, and when the region knew the state did not act.
- Alerted Flint residents about the potential harm to public health (although not required under the SDWA).

The Flint water crisis demonstrates that public health is not protected when EPA regional staff—with multiple warning signs—do not use the agency’s SDWA authorities in conjunction with EPA oversight tools.

Conclusion

Effective program management tools provide a foundation for federal programs to achieve important goals like those in the SDWA. Oversight tools found in the SDWA are designed to protect public health from drinking water contamination, but they are only effective when used.

During the Flint water crisis, Region 5 leadership did not employ many of its SDWA authorities, as the state continued to debate LCR requirements and residents continued to drink potentially contaminated water. Flint drinking water contamination continued, in part, because the public health protection authorities of the SDWA were not used effectively. The EPA and its regional offices must understand their oversight tools and authorities, and not be reluctant to use them to protect public health.

To understand roles and responsibilities, Region 5 should clarify its region-state relationship with the state of Michigan. Region 5 also should establish a schedule for periodically training drinking water program staff and managers to confirm understanding of their roles and responsibilities, and the EPA's authorities for intervention. To improve drinking water oversight, Region 5 should establish a risk assessment protocol to heighten awareness, and establish control activities to properly monitor state programs. Cognizance of roles and responsibilities, as well as EPA authorities, is important not only for Region 5, but also for the EPA at the national level.

Recommendations

We recommend that the Regional Administrator, Region 5:

3. Publicly document clear expectations, roles and responsibilities between the EPA and the state of Michigan in an official document, such as a memorandum of understanding or a supplemental primacy document.
4. Implement a system for regional drinking water staff, managers and senior leaders, which incentivizes staff elevating and managers addressing important and emerging issues in accordance with the EPA's "Policy on Elevation of Critical Environmental and Public Health Issues."



Bottled water distribution in Flint was established during response efforts. (EPA photo)

5. Provide the public with all results from EPA reviews of Michigan's Safe Drinking Water Act program, and track the progress of identified corrective actions.

We recommend that the Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water:

6. Provide regular training for EPA drinking water staff, managers and senior leaders on Safe Drinking Water Act tools and authorities; state and agency roles and responsibilities; and any Safe Drinking Water Act amendments or Lead and Copper Rule revisions.
7. Implement a system to identify management risks in state drinking water programs, including elements such as atypical events, emerging public health concerns, environmental justice concerns and public health analyses.
8. Create a system that tracks citizen complaints and gathers information on emerging issues. The system should assess the risk associated with the complaints, including efficient and effective resolution.
9. Improve oversight by establishing a clear and credible escalation policy for EPA intervention in states. The policy should provide steps the EPA will take when states do not act.

Agency Response and OIG Evaluation

The EPA provided a coordinated response from Region 5, the OW and OECA. They provided planned corrective actions in their response, and provided additional clarifications in a June 5, 2018, meeting with the OIG. Based on the coordinated response and additional clarifications, the EPA provided acceptable planned corrective actions and completion dates for Recommendations 3 through 9.

Region 5 agreed with Recommendations 3, 4 and 5. For Recommendation 3, Region 5 will add clear roles and expectations, and post the annual Michigan PWSS program work plan and end-of-year evaluation on the EPA's website so that the information is available to the public. The projected completion date is October 1, 2018.

To address Recommendation 4, by October 31, 2018, Region 5 plans to incentivize and provide midyear and end-of-year feedback to staff, managers and senior leaders on elevating and addressing issues of concern. To address Recommendation 5, Region 5 noted that the 2010 and 2016 *Michigan Drinking Water Program Review* reports and the FY 2010 through FY 2016 *End-of-Year Evaluation* reports are currently available to the public online. They also plan to finalize a corrective action plan that stems from the 2016 *Program Review Report* and post this plan

online by September 30, 2018, and provide updates on progress by April 30 and September 30 each year thereafter.

OECA and the OW agreed with Recommendations 6 through 9. To address Recommendation 6, the EPA has been providing training on the LCR's optimal corrosion control treatment and optimal water quality parameter requirements. The workshops provide a review of LCR requirements and emphasize the tools and authorities drinking water programs can leverage to implement the requirements more effectively. The training has been delivered through in-person workshops at all EPA regions, as well as through special conference sessions. Since the inaugural workshop in FY 2016, the training has reached approximately 1,300 drinking water professionals (staff and managers) from federal and state drinking water programs, technical assistance providers and water utilities. Training was completed on May 31, 2018, and training needs will be reassessed by September 30, 2019. OECA and the OW also stated the training will be provided to senior leaders.

To address Recommendation 7, OECA and the OW initiated a work group with participants from both offices and EPA regions. This work group will identify ways to use drinking water data and other information to identify water systems that present, or are likely to present, a significant risk to public health. The work group will develop procedures and strategies by December 31, 2018.

To address Recommendation 8, OECA and the OW committed to either enhancing an existing system, or developing a new system to track and resolve citizen complaints by September 30, 2019.

For Recommendation 9, a work group including OECA, the OW and EPA regions will develop procedures and strategies to provide timely and effective EPA intervention where a state's response to risks is insufficient to protect human health. The EPA plans to make a policy decision by July 31, 2019.

Region 5, OECA and the OW provided supplemental technical comments that the OIG incorporated as appropriate. The EPA's coordinated response is found in Appendix C.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS							Potential Monetary Benefits (in \$000s)
Rec. No.	Page No.	Subject	Status ¹	Action Official	Planned Completion Date		
1	15	Establish controls to annually verify that states are monitoring compliance with all Lead and Copper Rule requirements, including accurately identifying tier 1 sampling sites and maintaining continuous corrosion control treatment.	U	Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water			
2	15	Revise the Lead and Copper Rule to improve the effectiveness of monitoring and corrosion control treatment protocols.	R	Assistant Administrator for Water	2/28/19		
3	27	Publicly document clear expectations, roles and responsibilities between the EPA and the state of Michigan in an official document, such as a memorandum of understanding or a supplemental primacy document.	R	Regional Administrator, Region 5	10/1/18		
4	27	Implement a system for regional drinking water staff, managers and senior leaders, which incentivizes staff elevating and managers addressing important and emerging issues in accordance with the EPA's "Policy on Elevation of Critical Environmental and Public Health Issues."	R	Regional Administrator, Region 5	10/31/18		
5	28	Provide the public with all results from EPA reviews of Michigan's Safe Drinking Water Act program, and track the progress of identified corrective actions.	R	Regional Administrator, Region 5	9/30/18		
6	28	Provide regular training for EPA drinking water staff, managers and senior leaders on Safe Drinking Water Act tools and authorities; state and agency roles and responsibilities; and any Safe Drinking Water Act amendments or Lead and Copper Rule revisions.	R	Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water	9/30/19		
7	28	Implement a system to identify management risks in state drinking water programs, including elements such as atypical events, emerging public health concerns, environmental justice concerns and public health analyses.	R	Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water	12/31/18		
8	28	Create a system that tracks citizen complaints and gathers information on emerging issues. The system should assess the risk associated with the complaints, including efficient and effective resolution.	R	Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water	9/30/19		

RECOMMENDATIONS

Rec. No.	Page No.	Subject	Status ¹	Action Official	Planned Completion Date	Potential Monetary Benefits (in \$000s)
9	28	Improve oversight by establishing a clear and credible escalation policy for EPA intervention in states. The policy should provide steps the EPA will take when states do not act.	R	Assistant Administrator for Enforcement and Compliance Assurance, and the Assistant Administrator for Water	7/31/19	

C = Corrective action completed.

R = Recommendation resolved with corrective action pending.

U = Recommendation unresolved with resolution efforts in progress.

Timeline of Key Events

Date	Event
Pre-2014	
1967	Flint switched from the Flint River as its primary water supply source to Lake Huron water supplied by Detroit.
2014	
April 17	The Flint water system water quality manager tells the MDEQ that if drinking water from the Flint River is distributed within the next couple of weeks, it will be against his direction.
April 25	City of Flint switched from purchasing water from Detroit to using the Flint River as a water source and using the Flint plant for treatment.
April 30	The MDEQ requires Flint to conduct two 6-month rounds of monitoring for lead and copper (July–December 2014 and January–June 2015) to determine whether corrosion control treatment is necessary.
May	Region 5 staff member first learns about Flint’s source water switch from an MDEQ employee. He provided analysis that lead levels were in compliance when leaving the plant.
May 15	First record of citizen complaint to Region 5 after the change in water source. The complaint was about the poor quality of Flint’s drinking water.
June 17	An MDEQ staff member emails a Flint water treatment plant operator to confirm that no orthophosphate (a corrosion inhibitor) is to be added so no monitoring is necessary.
July 1	Flint begins first 6-month monitoring period for lead and copper.
August	City of Flint violates the National Primary Drinking Water Regulations (NPDWRs) for E. coli bacteria and total coliform. The city issues a boil advisory on August 15.
Aug. 15	Flint increases flushing of water and boosts chlorine disinfectant use.
Oct. 17	Genesee County Health Department expresses concerns about a <i>Legionellosis</i> outbreak and possible connection to water supply.
Dec. 16	The MDEQ notifies Flint of initial quarterly violation of SDWA Disinfection Byproducts (total trihalomethanes) requirements. Subsequent notices of violations were issued in March and June 2015.

Date	Event
Dec. 30	Flint completes its first 6-month round of lead monitoring with results above the PQL of 5ppb.
2015	
Jan. 1	Flint begins the second 6-month monitoring period for lead and copper.
Jan. 12	Detroit offers to reconnect Flint's water system to its water system and waive the \$4 million connection fee. Flint declines the offer on January 29, 2015.
Feb. 10	Genesee County Health Department epidemiologist consults outside experts about 47 <i>Legionellosis</i> cases, and a possible connection with the Flint water system.
Feb. 16	Flint posts its Flint water frequently asked questions, and states that Flint water is safe to drink.
Feb. 18	Lead levels of 104 ppb found in tap water of a Flint resident's home.
Feb. 25	The EPA assigns an EPA disinfection by-products expert to participate on Flint's Technical Advisory Committee.
Feb. 26	Region 5 staff member receives a call from a Flint resident regarding high lead levels in the water in her home. The resident said the city of Flint and the MDEQ attributed it to premise plumbing, but the resident has plastic pipes in her home.
	Region 5 notifies the MDEQ of high lead levels in tap water of Flint resident. Test results show lead levels at 104 ppb. The MDEQ advises Flint to collect a follow-up sample from the resident's home.
	The sentiment at MDEQ staff discussions: Flint is not above the 90 th percentile of 15 ppb for lead, so "not sure why Region 5 (EPA) sees this one sample as such a big deal."
Feb. 26–27	Region 5 scientist emails various EPA staff members, an expert from the EPA's Office of Research and Development, and the MDEQ to inquire about the type of corrosion control treatment (CCT) now used in Flint.
Feb. 27	MDEQ manager informs Region 5 that Flint has an optimized corrosion control program. He also shares the results of the first 6-month round of testing to determine whether the system needs CCT. The 90th percentile of the results were 6 ppb, which is over the PQL of 5 ppb. The result is an indication that CCT is necessary.
	Region 5 scientist voices concerns to EPA colleagues that Flint's lead-sampling protocol (pre-flushing) is biasing lead results toward the low side.

Date	Event
Mar. 3	A follow-up sample of tap water collected by the city of Flint had a lead level of 397 ppb at the same Flint residence where the lead level had been 104 ppb when a sample was first taken on February 18.
Mar. 10	Region 5 staff member emails the MDEQ saying that she has been inundated with citizen emails referred to her from the White House about Flint's water quality problems.
Mar. 26	EPA learns that Genesee County is investigating an increase in <i>Legionella</i> cases.
April 7	Region 5 scientist emails other Region 5 and EPA Office of Research and Development staff saying Flint needs help, and the system needs to be evaluated. The city's practice of pre-flushing ahead of collecting samples results in an inadequate capture of lead released in the service lines.
April 24	An MDEQ staff member tells Region 5 scientist that the Flint system does not have any CCT.
April 25	Region 5 scientist notifies MDEQ staff that CCT should have been maintained with the source switch. Region 5 scientist also tells the MDEQ that lead levels may be much higher than the compliance results indicate due to lack of CCT and pre-flushing.
April 27	Region 5 scientist meets with Flint resident to review internal plumbing, and provide sampling bottles to take water samples for lead in the resident's home.
May 1	The MDEQ informs Region 5 that it had not made a formal decision as to whether the city meets the exemption criteria for corrosion control treatment. The MDEQ also reasoned that since Flint would be switching source water in another year to the Karegnondi Water Authority (KWA), requiring the study at this time would be of little value.
May 6	EPA Region 5 visits a Flint resident's home (see Feb. 18, March 3 and April 27 entries) to collect pipe samples from the service line. Three sections of the service line were extracted and sent to Virginia Tech University for analysis. The EPA leaves sample bottles for the resident to collect sequential samples following the expected replacement of the service line.
	EPA Region 5 collects a set of sequential samples from two additional Flint residences, one had low lead levels, the other high lead levels.
	The city of Flint tests the water at two more homes. Both homes had high lead results.

Date	Event
May 11	Region 5 staff member asks an EPA Office of Research and Development expert about the value of starting CCT immediately. The expert notes that Flint has multiple problems, and CCT should be integrated into a long-term plan.
May 13	Region 5 scientist samples the Flint residence (see Feb. 26 and Mar. 8 entries) after disconnection from an old service line. Results show that water is below the action level.
June 10	During a conference call, Region 5 tells the MDEQ that Flint is likely to need corrosion control treatment, and the expertise of the Office of Research and Development should be used to avoid problems moving forward.
June 24	Region 5 had information that at least four homes in Flint had lead in drinking water in concentrations above the action level.
	Region 5 scientist releases interim report on high lead levels in Flint drinking water.
July 10	Region 5 Regional Administrator writes to Flint's Mayor and states the EPA will work with the MDEQ on issues related to lead in the water.
July 21	Region 5 informs the MDEQ about the region's interpretation of the LCR, and that Flint should have been maintaining corrosion control treatment since the source switch. The MDEQ disagreed with the interpretation, stating that it was premature, and requests a legal opinion. However, the MDEQ did agree to start CCT as soon as possible.
	The MDEQ will not change its sampling protocol regarding pre-flushing until new state regulations are issued.
July 24	The MDEQ emails the EPA the results from the second 6-month monitoring period. The 90 th percentile result is 11 ppb, above the PQL of 5 ppb.
Aug. 17	The MDEQ orders Flint to optimize CCT within 6 months.
Aug. 23	Independent researcher notifies city of Flint that his research team has started collecting samples for a water quality study in Flint.
Sept. 3	Flint Mayor announces that CCT will be implemented and invites EPA corrosion control experts to join Flint technical advisory committee.
Sep. 8	Independent research team issues a report indicating that 40 percent of Flint homes have elevated lead levels. "Flint has a very serious lead in water problem."
Sep. 10	OECA Water Enforcement Division (EPA headquarters) attorney acknowledges learning about the Flint situation and articulates plans to follow up with Region 5 staff.

Date	Event
Sep. 11	Local doctor convenes study of children's blood lead levels following findings about lead in drinking water from independent research team.
Sep. 15	Region 5 Regional Administrator calls the MDEQ and Flint Mayor to urge action on drinking water.
Sep. 24	Study completed by local doctor is released showing the numbers of children with elevated blood lead levels increased 90 percent after the switch to Flint River.
Sep. 25	Flint issues formal health advisory regarding lead in the drinking water.
Sep. 27	Region 5 Regional Administrator calls the MDEQ to expedite corrosion control treatment and to provide bottled water to residents.
Sep. 28	Region 5 Regional Administrator emails a 10-Point Plan to the EPA Administrator and asks the Office of Research and Development Director to encourage the MDEQ to call in Michigan Department of Health and Human Services for assistance.
Oct. 1	Michigan's Chief Medical Officer confirms the results from the local doctor's blood lead level study.
	Genesee County Health Department issues <i>do not drink</i> advisory.
	Private and public sources donate \$105,000 to fund 5,000 water filters for Flint residents to be distributed to those with the highest risk first.
Oct. 5	EPA learned that the city of Flint claimed to use lime softening as CCT.
Oct. 6	The Technical Advisory Committee recommends a return to Detroit water. The MDEQ and the EPA agree to additional phosphate treatment for the already finished Detroit water.
Oct. 8	Michigan announces that Flint will go back to Detroit water system for drinking water.
Oct. 9	Michigan Congressman requests assistance from EPA Administrator.
Oct. 16	Flint returns to using treated water from Detroit.
	The EPA established the Flint Safe Drinking Water Task Force to provide the agency's technical expertise through regular dialogue with designated officials from the MDEQ and the city of Flint.
Oct. 18	The MDEQ's Office of Drinking Water and Municipal Assistance Director issues statement regarding how his office was mistaken in how it interpreted federal rules governing CCT.

Date	Event
Oct. 23	The EPA's Flint Safe Drinking Water Task Force provides the MDEQ with technical comments on Flint's CCT plan.
Nov. 3	The EPA's Office of Water issues a memo that clarifies the agency's interpretation that the LCR requires large water systems such as Flint to have optimized technologies in place.
Nov. 25	The EPA's Flint Safe Drinking Water Task Force releases its preliminary assessment, with recommendations on sampling protocol, operating procedures, corrosion control, and outreach during transition to the KWA.
Dec. 9	Flint begins supplemental corrosion control treatment.
Dec. 14	Mayor of Flint declares state of emergency.
2016	
Jan. 5	Michigan Governor declares state of emergency for Genesee County due to health and safety issues caused by lead in Flint's drinking water.
Jan. 12	Michigan Governor requests assistance from Federal Emergency Management Agency and activates the Michigan National Guard to help distribute bottled water.
Jan. 14	Michigan Governor requests major disaster and emergency declaration and federal aid.
Jan. 15	Michigan Attorney General initiates investigation to determine whether state laws were violated.
Jan. 16	President declares federal state of emergency for city of Flint with \$5 million in aid.
Jan. 21	The EPA issues Emergency Administrative Order to the state of Michigan, the MDEQ and the city of Flint.
Nov. 17	Region 5 acting Regional Administrator issues First Amendment to Emergency Administrative Order.

Source: OIG-created timeline of events. The timeline ends on the date the First Amendment to Emergency Administrative Order was issued. For all subsequent EPA activity, see the EPA's Flint Drinking Water Documents webpage.

Status of Emergency Administrative Order and Amendment

Emergency Administrative Order, January 21, 2016

The SDWA provides the EPA with the authority to order actions when there is imminent and substantial endangerment to human health, and when actions taken by state or local authorities are inadequate to protect public health. The EPA determined that responses from the city of Flint and the MDEQ were inadequate, and the EPA issued the SDWA emergency administrative order to the state of Michigan, the MDEQ and to Flint. Paragraphs 1–49 contain the EPA’s findings and conclusions. Paragraphs 50–64 identify actions required by the order, with assigned completion dates where applicable.¹⁹ The EPA provided the status of actions on May 30, 2018.²⁰

Paragraph Number	Due Date*	Required Action	Status
50	1/22/16	Within one day of the effective date of this Order, Respondents ²¹ shall notify EPA in writing of their intention to comply with the terms of this Order. For the purposes of this Order, "day" shall mean calendar day.	Complete
Reporting Requirements			
51	1/26/16 and weekly thereafter	Within five days of the effective date of this Order, the State shall create, and thereafter maintain, a publicly available website. Respondents must post on this website all reports, sampling results, plans, weekly status reports on the progress of all requirements and all other documentation required under this Order. The Respondents shall not publish to this website any personally identifiable information.	Complete Weekly status reports are ongoing

¹⁹ Text is not verbatim.

²⁰ Region 5’s Office of Compliance and Enforcement tracks progress on the emergency order and amendment.

²¹ Respondents are the state of Michigan, the Michigan Department of Environmental Quality, and the city of Flint.

52	1/31/16	The Respondents shall within 10 days of the effective date of this Order respond in writing, in accordance with Paragraph 51, to all of the EPA Flint Task Force's requests and recommendations made on November 25, 2015 and subsequent dates. The response shall include all actions Respondents have taken and intend to take in response to those requests and recommendations. The EPA Flint Task Force's requests and recommendations are publicly available at http://www.epa.gov/mi/flint-drinking-water-documents	Ongoing – Respondents continue to respond in writing to all of the Technical Support Team's (TST) (f/k/a EPA Flint Task Force) recommendations, including the TST's 1-22-2018 recommendation relating to the implementation of the American Water Works Association 810-17 Standard for replacement and flushing of lead service lines. All of the TST's recommendations and the corresponding City/State responses are on EPA's website.
53	1/31/16	Within 10 days of the effective date of the Order the Respondents shall provide the following information in accordance with Paragraph 51: a. Water quality parameter measurements (pH, total alkalinity, orthophosphate, chloride, turbidity, iron, calcium, temperature, conductivity) in the distribution system. The City is required by the MDEQ permit to monitor for these parameters at 25 sites quarterly and at 10 of these sites weekly;	Complete
	1/31/16	b. All lead in water testing results for the City since January 2013, including those not used for LCR compliance; and	Complete
	1/31/16	c. Identification of areas (e.g., zip codes, neighborhoods) in the City with elevated blood lead levels.	Complete

54	1/31/16	Within 10 days of the effective date of the Order, the Respondents shall provide, without publicly disclosing any personally identifiable information, the following directly to the EPA in accordance with Paragraph 66: a. Existing inventory of homes with lead service lines in Excel or similar format	Ongoing – An initial existing inventory was submitted; however, the inventory was severely lacking in completeness and accuracy. Flint recently submitted an updated estimate of their inventory based on Flint Action and Sustainability Team (FAST Start) project findings
		b. Addresses of homes that have had water service interruptions or street disturbances (e.g., water main breaks, road/sidewalk construction, etc.) within the last year; and	Complete
		c. Addresses of currently unoccupied homes.	Complete
55	Ongoing	Respondents shall cooperate with EPA as the Agency conducts LCR sampling and other diagnostic activities in the City.	Ongoing
Treatment and Source Water			
56	~	To Ensure that treated water meets finished water quality goals and is consistently maintained throughout the distribution system, that existing and potential plant operational and mechanical start-up issues are identified and addressed, and that water plant operations staff are proficient in treating the existing and new source water, Respondents shall comply with Paragraphs 57, 58 and 59.	Ongoing- Flint distribution system water quality monitoring reports are posted on the State of Michigan's Flint website. Current certified plant operator duties are being performed by a contractor. The operator certification level of this contractor meets the state requirements for operating the Flint water treatment plant. Two current employees of the Flint water plant took the D-1 Operator Certification Exam in early May 2018—still awaiting results.

57	Ongoing	Respondents shall maintain chlorine residual in the distribution system in accordance with SDWA and the National Primary Drinking Water Regulations ("NPDWRs")	<p>Ongoing- The City's contractor worked with the City and MDEQ to increase residual monitoring to 25 sites from 10 sites. City continues to sample at these locations to verify that an adequate chlorine residual is present throughout the distribution system.</p> <p>MDEQ approved the City's updated Revised Total Coliform Rule sampling plan on 5-14-2018 to include the required 25 sampling sites.</p>
58	Ongoing	The City shall continue to add corrosion inhibitors (e.g., orthophosphate booster) at levels sufficient to re-optimize corrosion control in the distribution system.	<p>Ongoing- The City continues to add orthophosphate as a corrosion inhibitor with 3.1 mg/L orthophosphate WQP requirement. There was an LCR violation and public notice triggered in January 2017. Orthophosphate data kept current on the State's website. Ongoing corrosion control studies will further inform the City on corrosion control treatment.</p>
59	2/4/16	To address optimization of corrosion control for the system as operated with its current water source, within 14 days of the effective date of this Order the Respondents shall submit to MDEQ and post in accordance with Paragraph 51:	

		a. Submit a plan and schedule to the MDEQ to review and revise as needed designated optimal corrosion control and water quality parameters as well as monitoring plans for LCR compliance and all other monitoring plans developed to ensure that the treatment plant is consistently and reliably meeting plant performance criteria and all other NPDWRs;	Ongoing - WQPs were submitted, but EPA continues to work with the Respondents to ensure that all the requirements of paragraph 59 are fully met. EPA is currently working with the Respondents to ensure that an LCR Compliance Plan is in place before the City takes over LCR compliance monitoring from MDEQ.
		b. Submit a sampling plan for daily monitoring of water quality parameters in the distribution system with results compiled in a weekly report in an approved format; and	Ongoing – WQP monitoring is being conducted by the City, but EPA continues to work with the Respondents on the development of a formal monitoring plan. The City is in the process of developing this plan.
		c. Submit an operations plan for the corrosion control equipment (storage day tanks, feed/injection systems), with results compiled in a weekly format, that includes monitoring, calibration, verification (pump catch, etc.) as well as daily monitoring of finished water corrosion control parameters. Results shall be submitted and posted weekly.	Ongoing – The corrosion control equipment plan initially submitted was inadequate. EPA, MDEQ, and the City continue to discuss how to finalize this plan. The City's contractor continues to work on related Standard Operating Procedures (SOP).

60	Ongoing	Respondents shall not effectuate a transition to a new water source for the City's PWS (e.g., from KWA) until such time as they have submitted a written plan, developed through consultation with appropriate experts and after providing adequate advanced notice and an opportunity for public comment, to MDEQ and in accordance with Paragraph 51, demonstrating that the City has the technical, managerial and financial capacity to operate its PWS in compliance with SDWA and the NPDWRs and that necessary infrastructure upgrades, analysis, and testing have been completed to ensure a safe transition. Such plans shall include, but not be limited to, provisions addressing:	Revised in the First Amendment to the Emergency Order issued on November 17, 2016 The City has agreed to a 30-year long-term water source, blend of Great Lakes Water Authority (GLWA)/ Genesee County Drainage Commissioner (GCDC) water agreement. See section 60 in the Amendment below for details.
		a. The impacts on corrosion control for any new source water and an operations plan for periodic use of existing sources of water;	
		b. Completion of corrosion control study for any new sources;	
		c. Implementation of a "performance period" that allows for the demonstration of the adequacy of treatment of the new water source to meet all NPDWRs before it can be distributed to residents; and	
		d. The City's technical, managerial and financial capacity to meet SDWA 's applicable requirements, including the NPDWRs, during and after the transition to any new water source.	

Treatment and Distribution System Management			
61.	2/5/16	<p>Within 15 days of the effective date of this Order, the City must demonstrate, and the MDEQ and State must ensure, the City has the necessary, capable and qualified personnel required to perform the duties and obligations required to ensure the PWS complies with the SDWA and the NPDWRs.</p>	<p>Ongoing –Hiring additional Public Water System staff remains a challenge for the City of Flint because of fiscal limitations. The City now meets operator-in-charge, laboratory supervisor, and technician needs through the use of a contractor. Two current staff from the water treatment plant are scheduled to take the Operator Certification exam in May 2018. EPA continues to request hiring updates during its monthly meetings with the Respondents to ensure that the plant is properly staffed.</p>
62.	2/21/16	<p>To ensure the City's PWS is adequately operated to meet SDWA and all NPDWRs, within 30 days of the effective date of this Order, the Respondents shall submit the steps they will take to develop and implement a distribution system water quality optimization plan to MDEQ and in accordance with Paragraph 51, to evaluate and improve its programs that affect distribution system water quality, including: evaluating conditions within the distribution system; creating better documentation; and enhancing communication between the various utility functions that impact distribution system water quality. The MDEQ must ensure that this plan is adequate to ensure SDWA compliance and the State must ensure it is executed.</p>	<p>Ongoing— An inadequate plan was submitted in 2016. The City's contractor recently updated the distribution system optimization plan, and this document is expected to be finalized soon. Ongoing work on SOP development continues.</p>

Independent Advisory Panel (“IAP”)			
63.	1/28/16	Within seven days of the effective date of this Order, the MDEQ and State, with the City's input and concurrence, shall engage a panel of independent, nationally recognized experts on drinking water treatment, sampling, distribution system operation, and members of the affected community to advise and make public recommendations to the City on steps needed to mitigate the imminent and substantial endangerment to the health of persons and general operation of the City's PWS to ensure compliance with SDWA and the NPDWRs.	Panel was engaged and is known as the Flint Water Interagency Coordination Committee (FWICC). However, no public recommendations have been made. NOTE: Frequency of meetings reduced from monthly to every other month. Only one meeting has occurred in 2018.
64.	Ongoing	The charge to the IAP will include the following: a. Make recommendations to the Respondents, and for consideration by the EPA, to ensure the safe operation of the City's PWS.	Ongoing See Michigan governor's website . One resolution was passed, but was not a recommendation. It was to extend the declaration of the Flint Water Emergency. However, MDEQ frequently refers to "FWICC Recommendations" and then says they are not "official." No recommendations have been made for consideration by EPA.
		b. Make other recommendations to the Respondents, and for consideration by the EPA, to better serve the community served by the City's PWS.	See above

* Stated as within number of days since the effective date of this order—January 21, 2016.

Note: For current status and details, see the MDEQ’s [Taking Action on Flint](#) webpage.

First Amendment to Emergency Administrative Order, November 17, 2016

Issued by Region 5, the First Amendment to Emergency Order clarifies what is expected from the state of Michigan, the MDEQ and the city of Flint. The amendment is intended to provide flexibility for respondents to develop their own plan while creating accountability to provide safe and reliable drinking water. The amendment also was designed to restore public confidence.

Required Actions		Due Date	Status
Paragraph 60 in the January 21, 2016, Order Shall Now Read:			
a.	<u>Confirmation of Water Sources</u>		
	The City shall confirm in writing to EPA its intended new water source and emergency back-up water source within five days of the effective date of the First Amendment. Nothing in this First Amendment prevents the City from identifying a different new water source. The City must notify EPA in writing within five days if there are any changes in its initial, or any subsequent, new water source designation.	11/22/2016 Extension granted to 12/1/2016	Completed- On 11/30/2016. Initial notification of recommended source change received from Mayor on 4/19/2017 – staying on GLWA and using GCDC-treated KWA water as emergency back-up. The City Council entered into a long-term water supply contract with GLWA on 11/21/2017.
b.	<u>Development and Implementation for New Water Source Treatment</u>		
	<u>i. Pipeline Plan</u> It is necessary to complete the KWA pipeline connection to the Flint water treatment plant ("WTP"). Respondents shall submit to MDEQ for its review and approval, to EPA for its review, and post to the public website under Paragraph 51, a written plan for completing the KWA pipeline connection to the Flint WTP ("Pipeline Plan"), within twenty-one days of the effective date of this First Amendment. The Pipeline Plan shall specify dates for major milestones, including at a minimum, the following: A. Complete engineering drawings; B. Submit permit applications and receive approvals; C. Request contract bidding and award; and D. Develop construction time table, including final completion date.	12/8/2016	This requirement is no longer applicable due to the City choosing to continue to rely on GLWA as its primary water source. However, the City still needs to complete the pipeline to connect to its backup source, GCDC.

	<p>Upon MDEQ's written approval of the Pipeline Plan, Respondents shall implement the Pipeline Plan, which must provide for pipeline completion and operation at least three months before the planned distribution date from any new water source.</p>		
	<p>ii. Water Treatment Plant Modification Plan ("WTPMP") Respondents shall submit to MDEQ for its review and approval, to EPA for its review, and post to the public website under Paragraph 51, by February 1, 2017, a written WTPMP that provides a preliminary evaluation for Flint's treatment of its identified new source water. The WTPMP shall include: A. An assessment of the treatment processes for the new source water; B. Identification of necessary Flint WTP infrastructure improvements, including the assessment of associated operation and maintenance needs; and C. A schedule with completion dates for major milestones, including, at a minimum, the following: (1) identifying, securing and utilizing funding source(s) and (2) implementing the necessary infrastructure upgrades and other identified improvements. Upon MDEQ's written approval of the WTPMP, Respondents shall implement the WTPMP.</p>	<p>2/1/2017</p>	<p>Submitted- On 3/1/2018 the City of Flint submitted the Water Treatment Plant Modification Plan to EPA and MDEQ. The document is currently under review.</p>
	<p>iii. New Source Treatment Plan ("NSTP") Respondents shall submit to MDEQ for its review and approval, to EPA for its review, and post to the public website under Paragraph 51, as soon as available and no later than the dates set forth below, a written plan to treat the new source water. The NSTP shall address the City's technical, managerial, and financial capacity to operate its PWS in compliance with the SDWA and NPDWRs, including requirements for optimal corrosion control treatment and water quality parameter monitoring. The NSTP shall be developed in consultation with appropriate experts and the public through adequate advanced notice and opportunity for comment. Prior to submittal of the NSTP, Respondents shall develop a corrosion control study for the new source water and submit the study to MDEQ for its review and approval, and to EPA for its review, by February 1, 2017. The NSTP shall be submitted by March 1, 2017, and shall specify a schedule with completion dates for major milestones, including, at a minimum, the following: A. Finalizing necessary standard operating procedures ("SOPs") for each aspect of the water treatment process for the Flint WTP;</p>	<p>2/1/2017</p>	<p>In Progress- The City completed a "coupon study" (not requested or required by EPA) on 11-20-2017 to further inform the pipe loop corrosion control study (required by EPA). The City is currently conducting Phase 1 of the pipe loop study for the current GLWA primary source, despite the TST urging the City to bypass Phase 1 and go directly to Phase 2. The City will also conduct</p>

	<p>B. Implementing infrastructure upgrades that were identified under the WTPMP;</p> <p>C. Conducting a corrosion control study for the new source water, including the analysis and testing of the impacts on corrosion control treatment under various circumstances to ensure a safe transition; and</p> <p>D. Developing and implementing a "performance period," which shall begin after the completion of the KWA pipeline connection to the Flint WTP, addressed in Paragraph 60(b)(i), and after the completion and implementation of all applicable requirements in Paragraph 60(b)(ii) and (iii). The performance period shall last as long as necessary, but no less than three months, to allow for the demonstration of the adequacy of treatment of the new water source to meet all SDWA and NPDWRs before it can be distributed to consumers.</p> <p>Upon MDEQ's written approval of the NSTP, Respondents shall implement the NSTP. After completion of the approved NSTP, and at least five days before the proposed distribution of the new source water, Respondents shall: (1) certify in accordance with Paragraph 60(c)(iv) that all elements of the NSTP have been implemented and (2) notify the public in accordance with Paragraph 51.</p>		<p>Phase 2 of the pipe loop study, but has suggested it focus only on the premise plumbing and not lead service lines, and will not consist of the final source water blend of GLWA and GCDC. EPA continues to discuss how to move forward and complete this study with Respondents.</p> <p>Unable to be completed until Flint has an approved New Source Treatment Plan that it is implementing and until Flint has been approved to start distribution of new source water. Flint is currently working on its New Source Treatment Plan and will not be ready to distribute new source water until late 2019 at the earliest.</p>
	<p>iv. Use of the Current Water Source Respondents must continue to use the current GLWA source to provide drinking water to the City until the City has demonstrated that all requirements of Paragraph 60 are met and EPA has concurred. Respondents shall provide documentation to EPA, and make publicly available under Paragraph 51, within thirty days of the effective date of the First</p>	<p>12/17/2016</p>	<p>Completed- An extension of several months was requested by Mayor Weaver on 12/16/2016. On 11/30/2017, EPA</p>

	Amendment, that Respondents have made arrangements to have continued access to its current GLWA source water until its transition to a new source water is complete.		received the City's signed Master Agreement for the 30-year GLWA contract with the State, GLWA, KWA, and GCDC as other parties to the agreement.
c.	Reporting and Notification Requirements		
	i. Respondents shall provide monthly updates regarding schedules and milestones, including amount of funds committed, by whom, and when funds will be available for disbursement under Paragraph 60, on the 1 st day of each month on the public website under Paragraph 51. Respondents shall continue to report monthly until all necessary requirements of Paragraph 60 are met.	By the first of each month	Ongoing- All reports due thus far have been completed and respondents continue to compile and submit reports for future monthly updates.
	<p>ii. If any event occurs, or has occurred, that may delay Respondents' ability to meet any schedule or milestone in Paragraph 60, Respondents shall notify EPA of that event within five days. If Respondents anticipate any reason they may be delayed in meeting any schedule or milestone in Paragraph 60, Respondents shall notify EPA within five days of the date they become aware of that reason for delay.</p> <p>Within 10 days of providing such notice to EPA regarding a delay in meeting schedules or milestones, Respondents shall provide contingency plans to address each delay to MDEQ for its review and approval and to EPA for its review.</p>	<p>Within 5 days of Respondent becoming aware of delay</p> <p>Within 10 days of notifying EPA of delay</p>	Ongoing
	iii. If at any point the City decides to change its water source specified under Paragraph 60(a), the City shall notify EPA in writing within five days of such decision. All provisions of Paragraph 60 will apply to any change in water source.	Within 5 days of a decision to change Flint's water source	Ongoing - Currently the City has agreed to a 30-year, long-term GLWA/GCDC agreement.
	iv. Respondents shall provide to EPA a written certification, as specified under Paragraph 67 of the Order, each time a plan, schedule, or milestone required under Paragraph 60 is fully implemented, until EPA has concurred that all requirements under Paragraph 60 have been fully implemented.	Each time a plan, schedule, or milestone under this paragraph is implemented	Ongoing

Agency Comments and OIG Evaluation

May 30, 2018

MEMORANDUM

SUBJECT: Response to the April 13, 2018, Office of Inspector General's Draft Report, "Management Weaknesses Delayed Response to Flint Water Crisis"

FROM: Susan Parker Bodine, Assistant Administrator
Office of Enforcement and Compliance Assurance

David P. Ross, Assistant Administrator
Office of Water

Cathy Stepp, Regional Administrator
Region 5

TO: Kevin L. Christensen, Assistant Inspector General
Office of Audit and Evaluation

Thank you for the opportunity to respond to the issues and recommendations presented in the Office of Inspector General (OIG) Draft Report (Project No. OPE-FY16-0031) regarding the response to the Flint water crisis. We also appreciate the additional time you provided us, so the Office of Enforcement and Compliance Assurance (OECA), the Office of Water (OW) and Region 5 could review OIG's April 13, 2018, Draft Report and provide this joint response. OECA, OW and Region 5 agree with all of OIG's recommendations and have already begun undertaking steps consistent with these recommendations. Below we provide our planned corrective actions and projected completion dates. Further, we have included as an attachment an update regarding the status of the Safe Drinking Water Act (SDWA) emergency order EPA issued in the Flint, Michigan, case (Attachment 1).

A critical part of EPA's core mission is to protect public health and ensure the safety of our nation's drinking water. We appreciate OIG's efforts to bring attention to these important issues. The Agency is working actively to improve SDWA compliance and help safeguard human health.

AGENCY'S RESPONSE TO REPORT RECOMMENDATIONS

OECA, OW and Region 5 appreciated the opportunity to ask clarifying questions regarding the recommendations during our May 7, 2018 teleconference. The Report makes nine recommendations. As explained during the teleconference, OECA, OW and Region 5 concur with these recommendations and will work expeditiously to implement them.

Recommendation No. 1

OIG recommends OECA and OW establish controls to annually verify that states are monitoring compliance with all LCR requirements, including accurately identifying tier 1 sampling sites and maintaining continuous corrosion control.

OECA and OW concur with this recommendation. OW has recently developed a standardized Annual Program Review template for the Public Water System Supervision (PWSS) program. This management review is conducted by the Regions for each State and covers required elements, including rule implementation. Within this section, specific LCR implementation metrics can be, and often are, discussed. This Annual Program Review template is being implemented in FY 2018, and OW will continue to adjust for future reviews to potentially include requiring an LCR implementation discussion in all future reports. In addition, EPA also conducts file reviews, which are data audits of the State's program files, approximately every three to five years. During a file review, EPA evaluates state implementation of LCR requirements, including tier 1 sampling sites and corrosion control. For compliance monitoring and enforcement programs, OECA will continue to explore options for creating a national oversight approach for the drinking water programs and present recommendations to its senior managers by June 2019.

Supplemental EPA Response and OIG Disposition of Corrective Actions:

The EPA provided supplemental information in a June 5, 2018, meeting with the OIG. In that meeting, and in subsequent correspondence on June 13, 2018, OECA and the OW revised the response herein to state that they agree on the value of national oversight for compliance monitoring and enforcement of the Drinking Water Program, but added that it is vital that they evaluate and develop it in a collaborative manner with their state partners. The offices plan to work with the states to develop an approach or a pilot for implementing a national compliance monitoring and enforcement oversight program for the Drinking Water Program, as appropriate, by June 2019. The OIG did not accept this response as meeting the intent of the recommendation, which asked that OECA and the OW establish annual controls. We do not agree that developing a pilot or approach constitutes establishing annual controls, per the recommendation language. Recommendation 1 is unresolved.

Recommendation No. 2

OIG recommends OW include in the revised LCR the most protective protocol for monitoring and corrosion control.

OW concurs with this recommendation regarding the importance of proper implementation of the protocol for monitoring and corrosion control, and we continue to work on the long-term revisions to the existing LCR. Most recently, OW engaged stakeholders as part of a federalism consultation. The Agency is evaluating input we received from our state, local and tribal partners

as well as the best available peer-reviewed science to ensure the Rule reflects the best ways to improve public health protection.

Supplemental EPA Response and OIG Disposition of Corrective Actions:

During a June 5, 2018, meeting, the OIG agreed to revise this recommendation. The revised recommendation reads as follows:

We recommend that the Assistant Administrator for Water:

2. Revise the Lead and Copper Rule to improve the effectiveness of monitoring and corrosion control treatment protocols.

This revision takes into account information the EPA must consider in developing the revised Lead and Copper Rule. Based on the revision, the OIG accepted this response from the EPA as meeting the intent of Recommendation 2. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 3

OIG recommends Region 5 publicly document clear expectations, roles and responsibilities between the EPA and the state of Michigan in an official document, such as a memorandum of understanding or a supplemental primacy document.

Region 5 concurs with this recommendation. To implement this recommendation, the Region will document clear expectations, roles and responsibilities between the EPA and Michigan in the annual workplan for the PWSS program grant. To implement this recommendation, Region 5 will post the annual Michigan PWSS program workplan and end of year evaluation on EPA's website so that the information is publicly available.

The PWSS grant workplan covers work conducted as part of SDWA primacy/regulatory requirements, voluntary program efforts and EPA/State work sharing. It also includes commitments as well as additional expectations in the form of specific targets and measures, including both national and Regional measures. These extensive performance measures provide additional expectations of the State and assist the Region in evaluating the State's performance.

The new PWSS program workplan for FY 2019 provides an overall summary that identifies state-specific priorities and core program descriptions that serves as a brief overview for senior management. The workplan also provides separate files with the program-specific summaries that have more detail for staff and mid-level management, such as rules/primacy, data management and reporting, enforcement and compliance assistance, laboratory certification and sanitary surveys.

Supplemental EPA Response and OIG Disposition of Corrective Actions:

The EPA provided supplemental information during a June 5, 2018, meeting with the OIG. In that meeting, EPA Region 5 said it will develop a clarified statement of roles and responsibilities. The region will document clear roles and responsibilities in the annual PWSS work plans. Based on the revisions, the OIG accepted this response as meeting the intent of Recommendation 3. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 4

OIG recommends Region 5 implement a system for regional drinking water staff, managers and senior leaders, which incentivizes staff elevating and management addressing important and emerging issues in accordance with EPA's Policy on Elevation of Critical Environmental and Public Health Issues.

Region 5 concurs with this recommendation and has worked to foster an environment where management encourages issue elevation and staff have opportunities to elevate issues of concern to management, especially when there appears to be a substantial threat to public health. On August 15, 2017, Administrator Pruitt reaffirmed to all staff the importance of elevating critical environmental and public health issues so that EPA can properly assess them and respond at appropriate policy and governmental levels in a timely and effective manner.

Within Region 5, staff are encouraged to participate and share concerns in a variety of meetings including team, section, branch, division, and regional meetings. These regular check-in meetings among managers and staff allow for information to flow from regional leaders down to staff and vice versa. Region 5 agrees to explore ways to incentivize staff to elevate issues of concern during these engagement opportunities including providing feedback during mid-year and end-of-year reviews with staff, specifically on the customer service critical element present in all staff PARS agreements.

In addition to discussion during performance reviews, supervisors have the following award mechanisms available to recognize staff efforts: Agency's annual awards process recognizing key accomplishments, time-off awards, and monetary awards. Region 5 will further explore ways to incentivize staff and management to elevate and address important and emerging issues, such as a peer-to-peer recognition system.

Supplemental EPA Response and OIG Disposition of Corrective Actions:

The EPA provided supplemental information during a June 5, 2018, meeting with the OIG. In that meeting, Region 5 said it will incentivize staff, managers and senior leaders to elevate issues of concern. Region 5 also clarified that it will provide feedback during midyear and end-of-year reviews with staff, managers and senior leaders, and that it will identify ways to further incentivize staff, managers and senior leaders to elevate and address issues. Based on the revisions, the OIG accepted

this response as meeting the intent of Recommendation 4. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 5

OIG recommends Region 5 provide the public with all results from EPA reviews of Michigan's Safe Drinking Water Act program, and track the progress of identified corrective actions.

Region 5 concurs with this recommendation and has already made information publicly available. The 2010 and 2016 Michigan Drinking Water Program Review Reports are currently available on EPA's website (<https://www.epa.gov/mi>). In addition, Region 5's FY 2010 – 2016 End-of-Year Evaluation Reports for the State of Michigan's PWSS Program are available to the public through FOIA on-line (<https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d281731e1c>)

Region 5 ensures that issues found in previous data and enforcement program reviews of the State's PWSS implementation are included in the following year's annual PWSS program workplan and tracked for progress. Region 5 and MDEQ are finalizing a Corrective Action Plan that has been developed from the recommendations in the 2016 Program Review Report, which Region 5 released in October 2017 (<https://www.epa.gov/mi/2016-michigan-drinking-water-program-review>). Once final and approved by Region 5, Region 5 will post the Corrective Action Plan to the Agency's website and provide progress updates on a quarterly basis. In addition, the Michigan Corrective Action Plan will be attached to the FY 2018 and subsequent PWSS grant workplans so that both State and EPA commitments are clear. Frequent check-ins with the State are planned to ensure progress in implementing EPA's recommendations to strengthen Michigan's drinking water program.

Beginning with the FY 2019 PWSS grant, the Region 5 Water Division Director will document that EPA recognizes those primacy activities that Region 5 States are not fully implementing and will require the States to provide both short-term and long-term plans for implementing these activities.

OIG Disposition of Corrective Actions:

The OIG accepted this response from the EPA as meeting the intent of Recommendation 5. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 6

OIG recommends OECA provide regular training for EPA drinking water staff, managers and senior leaders on SDWA tools and authorities; state and agency roles and responsibilities; and any SDWA amendments or LCR revisions.

As noted during our May 7, 2018 teleconference with OIG, OECA and OW share responsibility for such trainings and plan to work together to implement this recommendation. Accordingly, they asked that this recommendation be addressed to both OECA and OW. OECA and OW have provided national SDWA training covering a range of topics, including statutory authorities, such as SDWA Section 1431 and Section 1414, and LCR requirements. OECA and OW commit to expanding their training for states, regions and Headquarters on these SDWA issues.

As part of ongoing Agency efforts to enhance national implementation of the LCR, EPA has been providing training on the Rule's optimal corrosion control treatment and optimal water quality parameter requirements. The workshops provide a review of LCR requirements and emphasize the tools and authorities drinking water programs can leverage to implement the requirements more effectively. The training has been delivered through in-person workshops at each of the EPA Regions, as well as through special conference sessions. Since the inaugural workshop in FY 2016, the training has reached approximately 1,300 drinking water professionals (staff and managerial level) from federal and state drinking water programs, technical assistance providers and water utilities.

Supplemental EPA Response and OIG Disposition of Corrective Actions:

The EPA provided supplemental information during a June 5, 2018, meeting with the OIG. In that meeting, OECA and the OW clarified that the training described will also be provided to senior leaders. Based on the revisions, and subsequent correspondence on June 12, 2018, the OIG accepted this response as meeting the intent of Recommendation 6. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 7

OIG recommends OW implement a system to identify management risks in state drinking water programs, including elements such as atypical events, emerging public health concerns, environmental justice concerns and public health analysis.

OW concurs with this recommendation. EPA has initiated a workgroup with participation from OECA, OW and the Regions. The workgroup will explore how best to use drinking water data and measures to identify public water systems that present or are likely to present a significant risk to public health. The workgroup will develop procedures and strategies to ensure timely and effective intervention where risks to public health are identified. Initial findings and the workgroup's proposed framework for action are expected by the end of December 2018.

OIG Disposition of Corrective Actions:

The OIG accepted this response from the EPA as meeting the intent of Recommendation 7. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 8

OIG recommends OW create a system that tracks citizen complaints and gathers information on emerging issues. The system should assess the risk associated with the complaints, including efficient and effective resolution.

As explained during our May 7, 2018 teleconference with OIG, OECA and OW also plan to work together to implement recommendation no. 8 and, thus, we ask the OIG to address this recommendation to both offices. OECA and OW are exploring ways to adapt or leverage existing tools. For example, OECA currently supports a public, online Report a Violation (RAV) tool (<https://echo.epa.gov/report-environmental-violations>) that collects general information about violations. That tool is currently not specific to drinking water data, but it has been used to receive descriptions of potential SDWA violations. EPA may explore possible revisions that would capture more precise contaminant information if reporting capabilities within SDWA, SDWIS Prime, or STORET data systems cannot be modified to receive citizen drinking water contamination data. EPA could use the RAV as the foundation of an improved system that captures citizen reports and sorts them into ranked categories to facilitate identification of management risks that require EPA response.

OIG Disposition of Corrective Actions:

The OIG accepted this response from the EPA as meeting the intent of Recommendation 8. The recommendation is resolved pending completion of corrective actions.

Recommendation No. 9

OIG recommends OECA and OW improve oversight by establishing a clear and credible escalation policy for EPA intervention in states. The policy should provide steps the EPA will take when states do not act.

OECA and OW concur with this recommendation. On August 15, 2017, Administrator Pruitt reaffirmed EPA's Policy on Elevation of Critical Environmental and Public Health Issues. The Administrator directed EPA staff to elevate concerns quickly and directed the Regions to inform headquarters of any issues that are elevated under this policy.

OECA is providing training on the use of SDWA Section 1431 authority. In implementing the recommendation from the OIG's SDWA Section 1431 Management Alert in October 2016 for

OECA to update the 1991 SDWA Section 1431 guidance, over the past year, OECA worked with several Regions, OW and OGC to develop updates to the guidance. OECA is also conducting trainings on Section 1431 and the updated guidance.

OECA is currently considering the possibility of a national initiative to promote improved drinking water compliance. EPA has initiated a workgroup with participation from OECA, OW and the Regions. The workgroup will explore how best to use drinking water data and measures to identify public water systems that present or are likely to present a significant risk to public health. The workgroup will develop procedures and strategies to ensure timely and effective EPA intervention where a state's response to the risk is insufficient to protect the public's health. OECA will seek state input on whether to create a new national initiative to improve drinking water compliance starting in June 2018, and then will seek public comment in November 2018. OECA expects to make a decision after this engagement process by July 2019.

OIG Disposition of Corrective Actions:

The OIG accepted this response from the EPA as meeting the intent of Recommendation 9. The recommendation is resolved pending completion of corrective actions.

CLARIFYING INFORMATION REGARDING REPORT FINDINGS

EPA appreciates the opportunity to provide some clarifications to inform the Report's findings. EPA has included clarifications below, and Attachment 2 includes a more detailed itemization of clarifications and desired corrections.

First, EPA has identified instances where the Report's simplifications or generalizations result in statements that are factually incorrect or otherwise inconsistent with the Lead and Copper Rule's (LCR or Rule) requirements. EPA recognizes and appreciates that OIG's Draft Report aims to simplify and summarize the LCR's requirements and acknowledges that the Report's findings about the LCR provide important information on EPA's implementation of the Rule.

Second, we want to highlight EPA's concerns about the Draft Report's detailed timeline of events; we think additional information needs to be included for it to be complete and accurate. This timeline, which involves several different government agencies and several EPA offices, is important in understanding the findings and recommendations in the Draft Report. We believe that the additional information provided will allow for a more accurate timeline.

The major clarifications that EPA would like to provide on OIG's Draft Report are as follows:

1. The Report's use of generalized terminology such as "maintaining corrosion control," without including the term "treatment," adds ambiguity to the audit's findings by implying Flint was or could have complied with the LCR without installing treatment, which is factually inaccurate. There are two intentionally distinct terms used in the LCR regarding corrosion control; these are "corrosion control" and "corrosion control

treatment.” The LCR provides that systems can be deemed to have optimized corrosion control with or without treatment so there is an intentional distinction between “optimized corrosion control” and “optimized corrosion control treatment,” which is especially important with respect to Flint. The term “corrosion control treatment” should be used throughout the Report when referring specifically to the Flint water system.

OIG Response:

The OIG reviewed our use of these terms, and we made changes to the report as appropriate.

2. The Draft Report includes several references suggesting a 5 parts per billion (ppb) benchmark is used to determine when corrosion control treatment installation is required. EPA would like to clarify that all large systems must install corrosion control treatment, regardless of their tap sampling results, unless they meet certain criteria identified in 40 C.F.R. Section 141.81(b).

EPA would also like to clarify that the LCR’s treatment technique requirements (e.g., corrosion control treatment installation, lead service line replacement, public education) are triggered when 90th percentile concentrations exceed the lead action level of 15 ppb. Average concentrations are not used, as currently suggested in the Report.

OIG Response:

The OIG reviewed our description of the LCR’s use of the PQL, and we made changes to the report to clarify the EPA point listed above.

3. To provide a clear description and timeline of events, additional information is required. Two areas requiring additional clarity are:

- A. Instances in which the Draft Report concludes that EPA had access to timely information, when, in fact, EPA believes the state did not provide complete, accurate, and timely data to EPA:

- **Page 12, 1st paragraph under “Corrosion Control Was Not Maintained”:**

“The MDEQ did not require Flint’s public water system staff to maintain corrosion control when Flint changed water sources in April 2014. According to EPA Region 5, the MDEQ concluded that this change in source water would classify Flint as a new drinking water system.”

The above sentence conveys that EPA knew of MDEQ's decision to classify Flint as a new water system in 2014; EPA was not aware of this decision until 2015.

- **Page 19, 2nd paragraph under “Region 5 Did Not Have an Effective System for Risk Assessment”:**

“By compiling and examining these factors, Region 5’s staff and managers could have intervened earlier to oversee the drinking water source switch and subsequent events. Instead, the federal response was delayed while residents continued to be exposed to lead in their drinking water.”

The above paragraph does not accurately characterize the timeline of events. The Total Coliform Rule and Disinfectants and Disinfection Byproducts Rule maximum contaminant level violations occurred after the source switch. It is unclear how violations that occurred after the source switch could have led Region 5 to oversee something that had already happened (the source switch).

- **Page 24, 1st paragraph:**

“Although this is true, regional staff knew of the source switch soon after it happened.”

This sentence overlooks the fact that the LCR was specifically amended to require advanced notification of long-term source and treatment changes to the State, and to require the State to review and approve of these changes, not EPA. Region 5 did not learn of the lack of corrosion control treatment maintenance until a year later, on April 24, 2015, when the State communicated that Flint did not have corrosion control treatment.

OIG Response:

The OIG included additional text on page 28 noting that Region 5 did not know about the MDEQ misclassification until 2015. The OIG did not make substantial changes to the discussion of risk assessment. The objective for this discussion is to note that information from various sources came to Region 5 over a period of time—both before Flint changed drinking water sources and after the change occurred. As information about risks mounted over time, Region 5 may not have known that lead contamination existed, but it could have identified Flint as a system with a high level of risk. This could have enabled the region to focus additional attention, questions, assistance, inspections and, where appropriate, enforcement resources on Flint and the MDEQ to forestall a potential drinking water incident like the one that occurred in Flint.

- B. Key activities that Region 5 completed between May 2014 and January 2016 to respond to citizen complaints are not clearly described in the Report. These actions are crucial to understanding how EPA responded to the scope of the recognized risks to public health.
- **Page 30, February 25, 2015 - Requested insert for timeline:** “EPA assigns Dr. Michael Wright, an EPA disinfection by-products expert, to participate on Flint’s Technical Advisory Committee.”
 - **Page 31, April 25, 2015 - Requested insert for timeline:** “Region 5 staff notifies MDEQ staff that CCT should have been maintained with the source switch. Moreover, even with MDEQ’s incorrect interpretation of the LCR, the July-Dec 2014 LCR compliance results of 6 ppb would have triggered the need for CCT since the 90th percentile was above the threshold in 40 C.F.R. Section 141.81(b)(3).”
 - **Page 31, April 27, 2015 – Requested addition to timeline:** “Region 5 scientists meet with [resident] and provide sampling bottles for her to take water samples for lead in her home.”
 - **Page 31, April 29, 2015 – Requested addition to timeline:** “Region 5 meets with and informs the MDEQ of the Region’s interpretation of the LCR and that Flint should have been doing corrosion control treatment since the source switch.”

OIG Response:

The OIG included additional timeline events where the EPA was able to provide documentation.

4. The Draft Report highlights events that, from OIG’s perspective, indicated an impending lead crisis in Flint. However, for the following reasons, at the time the events occurred, while they indicated problems, they were not clear indications of a lead crisis:
- Bacteriological contamination in public water systems is common in the summer months.
 - Disinfection by-product levels are typically highest in the summer months and exceedances may occur due to higher water temperatures and increased chlorine levels used in the summer months.
 - The residence with the high lead levels in early 2015 was an atypical situation (i.e., not indicative of other homes in the City). The home had an unusually long service line and the service line was physically disturbed in two places. Consequently, although this situation posed an obvious risk to the residents at that home, the high lead levels at that home did not indicate a system-wide concern, especially given that the Michigan Department of Environmental Quality (MDEQ) had indicated that the

system had corrosion control treatment in place at that time. It was not until April 2015 that EPA learned from MDEQ that Flint did not have corrosion control treatment in place.

- The LCR's 90th percentile compliance standard allows for 10% of homes to exceed the action level of 15 ppb. The City's 90th percentile values were at 6 ppb (December 2014) and 11 ppb (June 2015). It was not until September 2015 that EPA learned the City was not sampling at the required tier 1 (highest risk) sites for LCR compliance monitoring.

OIG Response:

The OIG's discussion on risk assessment is intended to describe how information that Region 5 accrued over time demonstrated a system at risk. In addition to the information in the bullets, the region also received citizen complaints, knew that the MDEQ had disinvested from some SDWA requirements, and that the city recently changed drinking water sources. As described above, Region 5 may not have known there was a specific risk of lead contamination, but it could have identified Flint as a system with a high level of risk. The region then could have focused additional attention, questions, assistance, inspections and, where appropriate, enforcement resources on Flint and the MDEQ to forestall a potential drinking water incident like the one that occurred in Flint.

5. The Draft Report refers to the LCR's Section 141.81(b)(3) criteria to allow Flint's system to meet the exemption criteria for corrosion control treatment. However, Flint never met the criteria in (b)(3). Flint's public water system was required to have corrosion control treatment; it met that requirement by the 1997 deadline through purchasing water from Detroit treated with orthophosphate. As EPA noted in its 2016 Michigan Drinking Water Program Review Report (<https://www.epa.gov/mi/2016-michigan-drinking-water-program-review>), MDEQ did not correctly review and approve Flint's source/treatment change in 2014.

OIG Response:

The OIG made modifications to the description of Flint's sampling under the LCR's Section 141.81(b)(3).

6. There is an important clarification needed to the timeline section on page 30 of the Draft Report. In February 2015, there were three statements in the email provided to Region 5 by an MDEQ manager that led EPA to believe corrosion control treatment had been maintained. MDEQ stated: (1) Flint has an optimal corrosion control program in place; (2) Flint is conducting water quality parameter monitoring; and (3) the system is in compliance with all treatment technique requirements. These statements, taken together, indicated that MDEQ believed that Flint was in compliance with the LCR requirement to

maintain corrosion control treatment and that the corrosion control treatment was being monitored using the required water quality parameter monitoring.

OIG Response:

The OIG's description on page 20 provides a summary of this point.

CONTACT INFORMATION

If you have any questions regarding this response, please contact Gwendolyn Spriggs (OECA) at (202) 564-2439, Steven Moore (OW) at (202) 564-0992, and Eric Levy (Region 5) at (312) 353-3611.

Attachments

**OIG Report: Management Weaknesses Delayed Response to Flint Water Crisis
Corrective Action Plan (CAP)**

Supplemental EPA Response and OIG Disposition of Corrective Actions:

The EPA provided supplemental information on proposed corrective actions during a June 5, 2018, meeting with the OIG. Based on the revisions, the OIG accepted EPA responses as meeting the intent for eight of the nine recommendations. Eight recommendations are resolved pending completion of corrective actions. Recommendation 1 is unresolved.

Recommendation	Lead Office	CA	Target Date	Corrective Action
1. Establish controls to annually verify that the states are monitoring compliance with all Lead and Copper Rule requirements, including accurately identifying tier 1 sampling sites and maintaining continuous corrosion control.	OECA OW	1	<p>PWSS Reviews: Beginning in 4th Quarter FY 2019 (September 30, 2019) and then ongoing.</p> <p>OECA national drinking water oversight approach recommendations: June 30, 2019.</p>	<p>EPA will continue to focus additional attention on metrics related to LCR implementation that can be incorporated into the protocol that Regions will use when conducting their annual Public Water System Supervision program reviews. The Annual Program Review template is being implemented in the FY 2018 and will continue to be adjusted for future reviews to meet oversight goals.</p> <p>For compliance monitoring and enforcement programs, OECA will continue to explore options for creating a national oversight approach for the drinking water programs and present recommendations to its senior managers by June 2019.</p> <p><i>Revised Corrective Action:</i></p> <p>OECA agrees on the value of national oversight for compliance monitoring and enforcement of the Drinking Water program, but it is vital that we evaluate and develop it in a collaborative manner with our State partners. Accordingly, we plan to work with the States to develop an approach or a pilot for implementing a national compliance monitoring and enforcement oversight program for the</p>

Recommendation	Lead Office	CA	Target Date	Corrective Action
				drinking water, as appropriate, by June 2019
<p>2. Include in the revised Lead and Copper Rule the most protective protocols for monitoring and corrosion control.</p> <p><i>Revised recommendation:</i></p> <p><i>Revise the Lead and Copper Rule to improve the effectiveness of monitoring and corrosion control protocols.</i></p>	OW	2	The estimated publication schedule for proposed revisions to the LCR is February 28, 2019.	The Agency is evaluating input we recently received from our state, local and tribal partners as well as the best available peer-reviewed science to ensure the Rule reflects the best ways to improve public health protection.
3. Publicly document clear expectations, roles and responsibilities between the EPA and the state of Michigan in an official document, such as a memorandum of understanding or a supplemental primacy document.	Region 5	3	FY 2019 Annual Workplan which will be posted by October 1, 2018.	<p>Region 5 documents clear expectations, roles and responsibilities between the EPA and each of our states in the annual workplan for the Public Water System Supervision (PWSS) program grant. To implement this recommendation, Region 5 will post the annual Michigan PWSS program workplan and end of year evaluation on EPA's website so that the information is publicly available.</p> <p><i>Revised Corrective Action:</i></p> <p>Region 5 will document clear expectations, roles and responsibilities between the EPA and each of our states in the annual workplan for the Public Water System Supervision (PWSS) program grant. To implement this recommendation, Region 5 will post the annual Michigan PWSS program workplan and end of year evaluation on EPA's website so that the information is publicly available.</p>

Recommendation	Lead Office	CA	Target Date	Corrective Action
4. Implement a system for regional drinking water staff, managers and senior leaders, which incentivizes staff elevating and management addressing important and emerging issues in accordance with the EPA's Policy on Elevation of Critical Environmental and Public Health Issues.	Region 5	4	PARS end-of-year for FY 2018, which must be completed by October 31, 2018.	<p>Within Region 5, staff are encouraged to participate and share concerns in a variety of meetings including team, section, branch, division, and regional meetings. These regular check-in meetings among managers and staff allow for information to flow from regional leaders down to staff and vice versa. Region 5 agrees to explore ways to incentivize staff to elevate issues of concern during these engagement opportunities, including providing feedback during mid-year and end-of-year reviews with staff, specifically on the customer service critical element present in all staff PARS agreements. Region 5 will further explore ways to incentive staff and management elevating and addressing important and emerging issues including the use of current awards, both recognition and monetary.</p> <p><i>Revised Corrective Action:</i></p> <p>Within Region 5, staff are encouraged to participate and share concerns in a variety of meetings including team, section, branch, division, and regional meetings. These regular check-in meetings among managers and staff allow for information to flow from regional leaders down to staff and vice versa. Region 5 agrees to incentivize staff, managers, and senior leaders to elevate and address issues of concern during these engagement opportunities, including providing feedback during mid-year and end-of-year reviews, specifically on the customer service critical element present in all staff, managers, and senior leaders PARS agreements. Region 5 will incentive staff, management and senior leadership</p>

Recommendation	Lead Office	CA	Target Date	Corrective Action
				to elevate and address important and emerging issues including the use of current awards, both recognition and monetary.
5. Provide the public with all results from EPA reviews of Michigan's Safe Drinking Water Act program, and track the progress of identified corrective actions.	Region 5	5	Will post the corrective action table by September 30, 2018, and provide updates on progress by April 30 and September 30 [f]or each year thereafter.	<p>The 2010 and 2016 Michigan Drinking Water Program Review Reports are currently available on-line. The FY 2010-2016 End-of-Year Evaluation Reports by Region 5 are available to the public through FOIA online.</p> <p>Region 5 and MDEQ are finalizing a Corrective Action Plan that has been developed from the recommendations in the 2016 Program Review Report, which Region 5 released in October of 2017. Once final and approved by Region 5, Region 5 will post the corrective action to the Agency's website and provide updates on a quarterly basis. In addition, the Michigan Corrective Action Plan will be attached to the FY 2018 and subsequent PWSS grant workplans so that both State and EPA commitments are clear. Frequent check-ins with the State are planned to ensure progress in implementing EPA's recommendations to strengthen Michigan's drinking water program.</p>
6. Provide regular training for EPA drinking water staff, managers and leaders on Safe Drinking Water Act tools and authorities; state and agency roles and responsibilities; and any Safe Drinking Water Act amendments or Lead and Copper Rule revisions.	OECA OW	6	<p>State/Regional staff LCR trainings conducted in all EPA Regions by May 31, 2018;</p> <p>SDWA Section 1431 training provided on May 23, 2018;</p> <p>Training efforts will be ongoing.</p>	<p>EPA has provided and will continue to provide regular training nationally about SDWA tools and authorities, like Sections 1414 and 1431, and various NPDWRs, including LCR.</p> <p>As part of ongoing Agency efforts to enhance national implementation of the LCR, EPA has been providing training on the Rule's optimal corrosion control treatment and optimal water quality parameter requirements. The workshops provide a review of LCR requirements and emphasize the tools and authorities drinking water programs can leverage to</p>

Recommendation	Lead Office	CA	Target Date	Corrective Action
			EPA will reevaluate training needs by September 30, 2019.	<p>implement the requirements more effectively. The training has been delivered through in-person workshops at each of the EPA Regions, as well as through special conference sessions.</p> <p><i>Revised Corrective Action:</i></p> <p>EPA has provided and will continue to provide regular training nationally to staff and managers about SDWA tools and authorities, like Sections 1414 and 1431, and various NPDWRs, including LCR. EPA will also make these trainings available to senior leaders.</p> <p>As part of ongoing Agency efforts to enhance national implementation of the LCR, EPA has been providing training on the Rule's optimal corrosion control treatment and optimal water quality parameter requirements. The workshops provide a review of LCR requirements and emphasize the tools and authorities drinking water programs can leverage to implement the requirements more effectively. The training has been delivered through in-person workshops at each of the EPA Regions, as well as through special conference sessions.</p>
7. Implement a system to identify management risks in state drinking water programs, including elements such as atypical events, emerging public health concerns, environmental justice concerns and public health analysis.	OW	7	Initial findings and the workgroup's proposed framework for action are expected by December 31, 2018.	EPA has initiated a workgroup with participation from OECA, OW and the Regions. The workgroup will explore how best to use drinking water data and measures to identify public water systems that present or are likely to present a significant risk to public health. The workgroup will develop procedures and strategies to ensure timely and effective intervention where risks to public health are identified.

Recommendation	Lead Office	CA	Target Date	Corrective Action
8. Create a system that tracks citizen complaints and gathers information on emerging issues. The system should assess the risk associated with the complaints, including efficient and effective resolution.	OW OECA	8	4 th Quarter FY 2019; September 30, 2019.	Identify potential enhancements to existing systems and/or identify new system requirements that can support tracking of citizen complaints.
9. Improve oversight by establishing a clear and credible escalation policy for EPA intervention in states. The policy should provide steps the EPA will take when states do not act.	OECA OW	9	<p>Training efforts will be ongoing. EPA will reevaluate training needs by September 30, 2019.</p> <p>Seek state input: June 30, 2018; Seek public comment: November 30, 2018; Decision on policy: July 31, 2019.</p>	<p>OECA will continue to provide training on SDWA authorities, including the use of SDWA Section 1431 when state and local authorities have not acted to protect public health.</p> <p>EPA has initiated a workgroup with participation from OECA, OW and the Regions. The workgroup will develop procedures and strategies to ensure timely and effective EPA intervention where a state's response to the risk is insufficient to protect the public's health.</p>

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Assistant Administrator for Water
Regional Administrator, Region 5
Associate Administrator for Congressional and Intergovernmental Relations
Associate Administrator for Public Affairs
Principal Deputy Assistant Administrator for Enforcement and Compliance Assurance
Deputy Assistant Administrator for Enforcement and Compliance Assurance
Deputy Assistant Administrator for Water
Principal Deputy Assistant Administrator for Water
Deputy Regional Administrator, Region 5
Director, Office of Continuous Improvement, Office of the Administrator
Director, Office of Children's Health Protection, Office of the Administrator
Director, Office of Compliance, Office of Enforcement and Compliance Assurance
Director, Office of Criminal Enforcement, Forensics and Training, Office of Enforcement and Compliance Assurance
Director, Office of Ground Water and Drinking Water, Office of Water
Director, Office of Water, Region 5
Audit Follow-Up Coordinator, Office of the Administrator
Audit Follow-Up Coordinator, Office of Enforcement and Compliance Assurance
Audit Follow-Up Coordinator, Office of Water
Audit Follow-Up Coordinator, Region 5
Public Affairs Coordinator, Region 5