Exhibit No. 17

MAWC – Exhibit 17
Rebecca B. Losli
Direct Testimony
File No. WR-2022-0303

Exhibit No.:	
Issues:	Capital Investment Program, Description of Plant Additions, Water Storage Tank Rehabilitation, Risk Associated with Providing Public Water and Wastewater Services
Witness:	Rebecca B. Losli
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR-2022-0303 SR-2022-0304
Date:	July 1, 2022

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2022-0303
CASE NO. SR-2022-0304

DIRECT TESTIMONY

OF

REBECCA B. LOSLI

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

AFFIDAVIT

I, Rebecca B. Losli, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am Vice-President of Engineering and Business Development for Missouri-American Water Company, that the accompanying testimony has been prepared by me or under my direction and supervision; that if inquiries were made as to the facts in said testimony, I would respond as therein set forth; and that the aforesaid testimony is true and correct to the best of my knowledge and belief.

Rebecca B. Losli

Rebecca B. Losli, PE

July 1, 2022

Dated

DIRECT TESTIMONY
REBECCA B. LOSLI
MISSOURI AMERICAN WATER COMPANY
CASE NO.: WR-2022-0303
CASE NO.: SR-2022-0304

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DIRECT TESTIMONY

REBECCA B. LOSLI

I. INTRODUCTION

Q. Please state your name and business address.

A. Rebecca B. Losli. My business address is 727 Craig Road, Creve Coeur, MO 63141

Q. By whom are you employed and in what capacity?

A. I am employed by Missouri-American Water Company (MAWC or the Company) as the Vice-President of Engineering and Business Development.

Q. Please summarize your educational background and business experience.

A. I received a Master of Business Administration degree from Washington University in St. Louis in 2010, a Master of Science in Environmental Engineering degree from Washington University in St. Louis in 2005, a Bachelor of Science in Civil Engineering degree from Washington University in St. Louis in 2002, and a Bachelor of Science in Physics and Mathematics degree from Samford University in 2002. I am a registered professional engineer in Missouri. I have more than 18 years of experience in the water and wastewater design and construction industry. From 2004-2010 I worked as an engineering consultant in Portland, OR and St. Louis, MO. I worked for several municipal, industrial, and federal clients. The projects ranged from water and wastewater planning to environmental remediation design. During this time, I authored more than 50 engineering studies for a very large Midwest wastewater utility. From 2008-2010 I worked part-time while attending Business School at Washington University full-time.

In 2010 I founded an engineering firm headquartered in St. Louis. The firm performed planning, design, and construction services for municipal clients. The firm grew to a staff of eight employees with offices in St. Louis and Kansas City, MO. The firm was sold in 2015. From 2015-2018 I led the water and wastewater department of a large consulting firm in the St. Louis area. During this time, I managed a large program for the Metropolitan St. Louis Sewer District's (MSD) Project Clear program to eliminate sanitary sewer overflows and increase system capacity. The program designed more than 100 sanitary relief, inflow and infiltration reduction, sanitary storage, and green infrastructure projects for MSD. I also worked on water, wastewater, and stormwater projects for several very large water utilities along with other smaller Midwest municipalities.

In 2018 I joined the MSD as the Program Manager for Program Planning, where I oversaw all wastewater and stormwater capital planning. The annual budget for MSD during this time was approximately $300M. In March of 2021, I became an employee of MAWC serving as the Director of Engineering. In April 2022, I was promoted to Vice-President of Engineering and Business Development for MAWC, the position I currently hold.

I am on the Missouri Partnership Board, the Hawthorn Foundation Board, the St. Louis Council of Construction Consumers Board, and serve as the Secretary for the Engineers' Club of St. Louis. I am a member of the following organizations: American Water Works Association, Water Environment Federation, National Society of Professional Engineers, Engineers' Club of St. Louis, and the St. Louis Council of Construction Consumers. Additionally, I serve on the McKelvey School of Engineering Alumni Advisory Board for Washington University.

Q. What are your current employment responsibilities?

A. As Vice-President of Engineering I oversee and manage the planning, design, and construction of water, wastewater, and other general facilities for MAWC, the development and updating of the Geographic Information System (GIS), and developer related services. My responsibilities include administering the capital program for the Company; maintaining compliance with state and federal requirements related to the planning for and delivery of the capital investment program; coordinating the procurement of all project design and construction services; providing comprehensive system planning for use in developing system needs and projecting capital spending; and supporting MAWC operations staff in performing plant/system troubleshooting. Additionally, I am responsible for Business Development for MAWC.

Q. Are you generally familiar with the operations, books and records of MAWC?

A. As Vice-President of Engineering and Business Development, I am familiar with the facilities and operations of the Company in each of its operating areas.

Q. Have you previously testified before the Missouri Public Service Commission?

A. No.

Q. What is the purpose of your direct testimony in this proceeding?

A. My Direct Testimony addresses four topics. First, I generally discuss MAWC's capital investment needs and capital planning process. Second, I describe the significant capital projects (defined as those placed in-service and having a Company investment greater than $1,000,000 for water and $500,000 for wastewater) by MAWC since the conclusion of the last rate proceeding test year, through the completion of the test year and true-up period for this rate proceeding (through December 31, 2022). Additionally discrete adjustments are presented for investments from January 1, 2023 through May 31, 2023 are presented ("Known and Measurable"). Additional project information such as in-service dates and final costs are included as an attachment to this Direct Testimony as Schedule RBL-1 -

Confidential. Third, I discuss the treatment of water storage tank rehabilitation and specifically the capitalization of tank coating systems. Lastly, I discuss the risk of providing public water and wastewater services.

II. CAPITAL INVESTMENT PROGRAM

Q. Does MAWC have significant capital investment requirements?

A. Yes, MAWC's water and wastewater infrastructure investment needs are substantial. MAWC investment needs are primarily related to non-revenue producing infrastructure replacement and compliance with new drinking water or wastewater standards as promulgated and enforced by the Missouri Department of Natural Resources (MDNR). MAWC's systems must comply with ever-increasing and more strict regulatory requirements for drinking water (e.g. the Safe Drinking Water Act) and wastewater (e.g. the Clean Water Act). Further, as is the case with much of the water and wastewater industry, MAWC's infrastructure is aging and in need of replacement. This aging infrastructure, our pipes, plants, etc., must be continually replaced so that MAWC can continue to provide our customers with safe, adequate, efficient, and reliable utility service. In addition, MAWC acquires small and struggling water and wastewater systems throughout Missouri. These small systems often require significant investment to meet the basic drinking water and wastewater regulatory requirements of the State of Missouri.

Q. How do aging infrastructure replacement needs affect MAWC?

A. As the largest investor-owned water and wastewater utility in Missouri, MAWC bears a considerable portion of the state's aging infrastructure investment burden. Much of the pipe, treatment, storage, supply, and other plant that are used to provide water and wastewater services are nearing the end of their life expectancy. In 2021 for example, MAWC placed in service improvements worth more than $271.4 million for replacement of its aging water distribution and wastewater collection infrastructure. This level of investment is working towards the optimal level of investment. In 2022, MAWC plans to place in service an additional $308.6 million to replace these aging systems, making a further step towards optimal. These levels of capital investment are anticipated to continue for the foreseeable future as more of MAWC's infrastructure reaches the end of its useful life. Moreover, while MAWC must continually invest in its aging infrastructure, it does so at rising costs. Costs are rising because material, fuel, and labor costs are increasing, but also because municipalities and government agencies are increasing their right of way restoration requirements. For example, utilities historically were required to restore pavement to a standard of two feet wider than the width of the trench required for pipe replacement, or typically four to six feet. Now, it is typical for pavement replacement to include the full width of the traffic lane (twelve feet) and in some cases, the full width of the street (24 feet or more). This has driven replacement costs upward considerably as restoration is now often more than 50 percent of the cost of water main replacement. As discussed later in this Direct Testimony, MAWC has invested or has planned investment of approximately $746 million in water facilities and $26 million in wastewater facilities from January 1, 2021 through May 31, 2023. The projects I describe clearly illustrate the types of aging infrastructure issues as well as changing regulatory requirements MAWC faces.

Q. What is the amount of MAWC's planned investment in this case for the replacement of water and wastewater distribution and collection mains and services?

A. MAWC plant additions in this case include more than $400 million for water and wastewater infrastructure replacement for pipes that are near the end of their useful lives. From the perspective of long-term sustainable customer service and water rates, replacing pipes that are near the end of their useful life in a systematic responsible manner will result in lower costs to customers over time as compared with deferring needed replacements and addressing problems, such as leaks and main breaks, as they arise. Planned pipe replacements are much less costly on a unit cost basis than the costs of increasing pipe breaks, service disruptions, property damages, health risks from potential drinking water contamination exposure during pipe breaks, related community opportunity costs related to community health and economic development, and the steep increase in future pipe replacements resulting from prior deferrals of the replacements.

Q. Will the main replacement projects have any impact on operation and maintenance costs?

A. In the absence of main replacement, the number of main breaks and associated repair costs will increase, and operation and maintenance O&M costs will increase accordingly. While weather, system demands and pumping pressure, and other factors can contribute to main breaks, the age of the mains is typically a common factor. The main replacement program will help to mitigate the increase in breaks the Company would otherwise expect as the mains continue to age and deteriorate.

Q. Does MAWC have a planning process for capital investment projects?

A. Yes. MAWC has a comprehensive capital planning process that assesses capital investment needs for all aspects of operations and assigns funding to capital programs on a prioritized basis.

Q. Please describe MAWC's comprehensive capital planning process.

A. MAWC develops a Comprehensive Planning Study (CPS) for each operating district. The planning process begins with the development of anticipated demand projects and regulatory requirements of the system, the identification of improvements needed to meet those demands, and the adoption of strategies to correctly prioritize and distribute capital spending for the various needs of the Company. Specific capital planning needs are addressed in both the short term (one year) and longer term (five years) and are included in the CPS completed for each service area. This CPS development process is repeated approximately every five years depending on the growth of the service area, changes in regulations, etc. and is one of the parameters used to set the baseline for the preparation of the annual capital budgeting process. A key component of the planning technique is that it is flexible and can be adjusted as necessary to address new needs such as unplanned equipment failures, large or sudden growth of a service area, or a new regulatory requirement. Project prioritization is done using objective criteria that validate the need for the project and the risk of not doing the project.

MAWC prioritizes capital investment using a risk-based approach known as the Risk Register. Through this process, identified system needs are assigned a relative rating based on the likelihood of an asset failure and consequence(s) of that failure. Projects that mitigate risks in the highest tiers of likelihood and consequence of failure, as defined by the Risk Register, are given high priority in Capital Plans. In addition, MAWC utilizes Geographic Information Systems (GIS) to track and analyze main breaks and other relevant information such as pipe materials and age, and municipal paving schedules to prioritize main replacements and minimize costs.

Based upon the results of the CPS and other specific needs of the service areas (such as meter replacements and other life cycle replacements) MAWC develops a proposed annual strategic capital expenditure plan (SCEP) in which capital expenditures are prioritized within the service districts and as part of a state-wide capital budget. This SCEP projects spending for specific projects and blanket expenditures for a five-year period. This capital plan is then reviewed by American Water Engineering for the reasonableness of the proposed projects and their forecasted costs. This process is repeated every year to update the SCEP to reflect any changes in need or prioritization, and to maintain a five year forward looking projection.

III. DESCRIPTION OF PLANT ADDITIONS

Q. Please describe MAWC's plant additions.

A. The projects that comprise the Company's plant additions in this case vary from what may be characterized as routine, recurring projects, such as the installation of individual distribution mains and services and hydrants, to substantially larger discrete projects, such as the replacement of transmission mains, safety and reliability upgrades at water production facilities; installation of emergency power generation equipment; water storage tank projects; and system acquisition improvements, which I discuss in greater detail below.

Q. How are you presenting MAWC's plant additions in your Direct Testimony?

A. Plant additions included in this case are separated into two groups for discussion purposes. The first includes plant investment from January 1, 2021 through December 31, 2022. The second includes investment from January 1, 2023 through May 31, 2023 (known and measurable investments).

Q. Please summarize MAWC's total plant additions from January 1, 2021 through

December 31, 2022.

A. For water facilities, MAWC invested approximately $655 million for plant placed in service between January 1, 2021, and December 31, 2022.

For wastewater facilities, the Company invested approximately $23 million for plant placed in service between January 1, 2021, and December 31, 2022.

Q. Please summarize plant additions anticipated to be placed in service from January 1, 2023 through May 31, 2023.

A. For water facilities, MAWC plans to invest approximately $88 million for plant placed in service from January 1, 2023 through May 31, 2023.

For wastewater facilities, MAWC plans to invest approximately $3 million for plant placed in service from January 1, 2023 through May 31, 2023.

Q. Can you describe these plant additions?

A. Yes. I describe the significant capital projects (defined herein to include those projects with a cost of more than $1 million for water systems and $0.5 million for wastewater) below and in Schedule RBL-1 - Confidential.

Q. Do the total plant additions include additional investments in water and wastewater facilities that are not specifically described in this Direct Testimony?

A. Yes. In addition to the capital projects listed below and in Schedule RBL-1 - Confidential, the Company will also enhance or maintain current levels of service, quality, reliability, and efficiency through numerous projects that do not fit within the definition of "significant capital projects" as I have defined the term above. These projects relate in part to the extension or replacement of water or wastewater distribution and collection mains, minor plant and pump station improvements, installation or replacement services, hydrants, and meters, and other capital expenditures such as vehicles, backhoes, building improvements, and computers.

Q. Please describe the significant capital projects placed in service during the period January 1, 2021 through December 31, 2022.

A. The significant capital projects completed are as follows:

- **Central Plant B High Service Switchgear & Station Service (I17020133)**

  This project replaces the Central Plant 3B (CP-3B) high service electrical switchgear as well as the station service switchgear for the control building. CP-3B has six individual pump and motor combinations ranging from 700 to 1,200 horsepower with a nominal pumping capacity of 66 million gallons per day (mgd) and was originally put into service in 1971. The electrical switchgear (motor starters, etc.) and cabling are currently 51 years old, and replacement is necessary due to the equipment's age, reliability, and obsolescence. The project replaces the outdated electrical equipment as an electrical failure (fault) could take one or more pumps out of service for weeks or months, depending on the amount of damage and the time to fabricate or procure repair parts.

- **Central Plant Outfall-Replacement 48" Pipe (I17020141)**

  This project replaces the 48" outfall pipe from Manhole P to the Missouri River. This outfall is critical to the operation of the treatment plant and all Central Plant 3 water treatment residuals and filter backwash water discharges to the Missouri River through this outfall. The previous pipe is a 48" corrugated metal pipe and is failing at several locations. In addition, as required in the renewal of our state NPDES discharge permit, the pipe must be extended, and the discharge point installed at a lower elevation to minimize the discharge plume to the Missouri River.

- **Hazelwood Tank #2 Roof Replacement (I17020150)**

  Hazelwood Tank #2 is a 118-foot diameter, 4-million-gallon ground storage tank, built in 1965. The roof and support structure are failing and in need of replacement. This project replaces the steel roof and support columns with a new, aluminum dome self-supported roof system.

- **North Plant East Basin Primary Flocculation Baffle Equipment Replacement (I17020183)**

  The North Plant East Basin was installed in 1964. While the equipment has been maintained, the flocculation equipment is beyond its useful life and in need of replacement. Replacing the electrical, mechanical, and controls equipment will improve the reliability and effectiveness of the flocculation process, and the resulting water quality.

- **Affton Tank #3 Roof Replacement (I17020186)**

  Afton Tank #3 is a 117-foot diameter, 4-million-gallon ground storage tank, built in 1967. The roof and support structure are failing and in need of replacement. This project replaces the steel roof and support columns with a new, aluminum dome self-supported roof system.

- **Central Plant B Basin HS Pump Vaults Refurbish (I17020207)**

  The Central Plant B Basin High Service Vaults (D, E, & F) were originally constructed and in service with the rest of the basin in the early 1970's. This project replaces the internal equipment, pump discharge valves, isolation valves, vault covers, access ways, lighting, ventilation, and elevated grating to make the equipment easier and safer to work on and increase the vault's lifespan. In addition, new individual pump flow meters were installed to measure individual pump performance. These vaults were a safety concern to access and work in, and the aging equipment was failing and in need of replacement.

- **North Plant East High Service Vault C Upgrade (I17020208)**

  The East Basin at North Plant has three high service vaults. These vaults contain pumps, valves, and related equipment. This project in Vault C replaces the internal equipment including pump discharge valves, isolations valves, vault covers, access way, ventilation, and elevated grating to make the equipment easier and safer to work on and increase the lifespan of the vault. This vault was a safety concern to access and work in, and the aging equipment was failing and needing replacement.

- **Central Plant B Basin Secondary Clarifier Drives w/rakes (I17020211)**

  The Central Plant B Basin has four secondary settling basin clarifier units for the removal of settled solids in the secondary settling basin. These units are past their useful service life. This project replaces the drive unit for each of the four clarifiers and will also replace the existing units with new rakes arms for the removal of settled solids due to their poor condition.

- **St. Joseph Water Plant Replace Clarifier Launders Ph II (I17030021)**

  This project consists of the removal and replacement of the radial launders on lime softening clarifier #2. They have corroded significantly and two have broken connections to the clarifier wall.

- **Warrensburg A-2 Replace Chlorine with Hypo (I17060004)**

This project will reduce the health and safety risk associated with the existing chlorine gas disinfection system at the Warrensburg WTP by installing a liquid sodium hypochlorite storage and feed facility. Currently the water treatment plant uses chlorine gas for disinfection. This project will construct a small new building to hold a liquid 12.5% sodium hypochlorite storage and feed system.

- **St. Charles Elevated Tank 2 MG (HRAM 4-5) (I17090013)**

This project provides a 2 MG composite elevated storage tank on MAWC-owned property to stabilize pressures and provide fire flow storage for the western half of the St. Charles pressure zone.

- **St. Charles District Office Garage (I17090017)**

This project provides a new dual-purpose multi-vehicle storage bay and storage building at the St. Charles District Office property. The new building will house water company maintenance vehicles, various pipe, fittings, valves, and pipe appurtenances that are currently staged behind the existing office building in a gravel lot, exposed to all types of weather, UV damage, surveillance for potential theft from adjacent properties.

- **Mexico Water Plant Replace Chlorine Gas System (A-2) (I17100002)**

This project will reduce the health and safety risk associated with the existing chlorine gas disinfection system at the Mexico WTP by installing a liquid sodium hypochlorite storage and feed facility. Once the new disinfection system is in service, MAWC will retire and remove the gaseous chlorine treatment system.

- **Joplin Water Plant Replace High Service Pump Station (I17110023)**

The existing High service Pump Station (HSPS) is located in a pre-1900 building that was not designed to accommodate the space requirements of the current demand or number of pumps (five pumps). The existing pumps are of varying sizes and are in need of replacement. The pumps have multiple discharge points from all sides of the building. The ring of discharge piping installed around the building is located above and below multiple other raw water and process pipes creating a high risk to all of the piping should one failure occur in any of the more than 60-years-old plant pipes. The pumps are difficult to operate efficiently because of the varying sizes (two at 4 MGD, one at 6 MGD and one at 8 MGD, and one at 9 MGD). The 8 MGD pump runs on natural gas and is only used during power outages due to the high cost of fuel and maintenance but is required due to a lack of sufficient generator capacity to run solely on electricity. The electrical space is extremely limited, preventing the installation of VFDs to better match the demand. The new HSPS will have six matching pumps driven by VFDs that can match the demand more closely and will have a backup generator.

- **Joplin WTP Hypochlorite Conversion to Bulk (I17110026)**

Currently, the Joplin WTP generates the sodium hypochlorite for disinfection. This project replaces the generators with a bulk storage and injection system and will consist of additional tankage, new feed pumps, injectors, and associated electrical and SCADA upgrades.

- **Pevely Farms Distribution Storage Tank (I17510002)**

The existing Stonewall Tank is a 0.111-MG floating ground storage stand pipe. The effective finished water storage volume is less than the total needed for equalization and fire storage. This project provides a second, 0.2MG, floating ground storage tank to meet current and projected fire flow and equalization storage requirements. It also provides for redundancy of a single point of failure should the existing storage tank experience a failure or need to be taken out of service for maintenance.

- **Big Bend Blvd Water Main Replacement Phase 3 (R17-02B1.19-P-0054)**

  This project installs approximately 3,100 feet replacing existing 8-inch and 12-inch parallel cast iron water mains with a new 16-inch ductile iron water main. This project is required due to recurring breaks and the general deteriorated condition of both parallel water mains. This project provides more reliable water service to this service area as well as improve fire flows and service pressure to the customers in the area.

- **Lindbergh and Guelbreth Water Main Replacement Phase 5 (R17-02B1.20-P-0007)**

  This project installs approximately 850 feet of 24-inch ductile iron and High Density Polyethylene (HDPE) water main to replace the existing 20-inch water main. This project is required due to recurring breaks and the general deteriorated condition of the water main. This project provides a more reliable water service to this service area as well as improve fire flow and service pressure to the customers in the area.

- **Dunn Rd Water Main Replacement (R17-02B1.20-P-0084)**

  This project installs approximately 2,450 feet of 30-inch ductile iron water main replacing the existing 30-inch cast iron water main. This project is in coordination with the Missouri Department of Transportation project on I-270. This project is necessary to replace prior to new pavement work in the area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement will increase the service reliability and improved fire flows and service pressures for the customers in the service area.

- **McKelvey Rd Water Main Replacement Phase 1 (R17-02B1.21-P-0006)**
  This project installs approximately 1,400 feet of 20-inch ductile iron water main replacing the existing 12-inch cast iron water main. This project is in coordination with the St Louis County Department of Transportation McKelvey Rd Project. This project is necessary to replace prior to new pavement work in the area. The pipe size will be increased due to high head loss in this service area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement will increase the service reliability and improved fire flows and service pressures for the customers in the service area.
- **McKelvey Rd Water Main Replacement Phase 2 (R17-02B1.21-P-0007)**
  This project installs approximately 1,950 feet of 20-inch ductile iron water main replacing the existing 12-inch cast iron water main. This project is in coordination with the St Louis County Department of Transportation McKelvey Rd Project. This project is necessary to replace prior to new pavement work in the area. The pipe size will be increased due to high head loss in this service area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement increases the service reliability and improved fire flows and service pressures for the customers in the service area.

- **Fleta St Water Main Replacement (R17-02B2.19-P-0284)**

  This project installs approximately 2,522 feet of 8-inch ductile iron water main replacing the existing 6-inch cast iron water main This project is required due to recurring breaks and the general deteriorated condition of the water main. This project provides a more reliable water service to this service area as well as improved fire flows and service pressures to the customers in this service area.

- **Viscount Drive Water Main Replacement (R17-02B2.19-P-0294)**

  This project installs approximately 2,450 feet of 8-inch PVC water main replacing the existing 6-inch cast iron water main. This project is required due to recurring breaks and the general deteriorated condition of the water main. This project provides a more reliable water service to this service area as well as improving fire flows and service pressures to the customers in this service area.

- **Edgefield Dr Water Main Replacement (R17-02B2.19-P-0295)**

  This project installs approximately 2,430 feet of 8-inch PVC water main replacing the existing 6-inch cast iron water main. This project is required due to recurring breaks and the general deteriorated condition of the water main. This project provides a more reliable water service to this service area as well as improving fire flows and service pressures to the customers in this service area.

- **Fain Dr Water Main Replacement (R17-02B2.19-P-0343)**

  This project installs approximately 2,125 feet of 8-inch PVC water main replacing the existing 6-inch cast iron water main. This project is required due to recurring breaks and the general deteriorated condition of the water main. This project provides a more reliable water service to this service area as well as improving fire flows and service pressures to the customers in this service area.

- **Graham Rd and Langdon Water Main Replacement (R17-02B2.19-P-0368)**
This project installs approximately 4,625 feet of 16-inch ductile iron water main replacing the existing 8-inch cast iron water main. The pipe size will be increased due to high head loss in this service area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement will increase the service reliability and improve fire flows and service pressures for the customers in the service area.

- **Natural Bridge Water Main Replacement Phase 2 (R17-02B2.20-P-0087)**
This project installs approximately 2,530 feet of 12-inch ductile iron water main replacing the existing 8-inch cast iron water main. This project is required due to recurring breaks and the general deteriorated condition of the water main. This project will provide a more reliable water service to this service area as well as improving fire flows and service pressures to the customers in this service area.

- **Hancock Ave Water Main Replacement (R17-02B2.21-P-0067)**
This project installs approximately 3,200 feet of 12-inch ductile iron water main replacing the existing 6-inch cast iron water main. The pipe size will be increased due to high head loss in this service area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement increases the service reliability and improves fire flows and service pressures for the customers in the service area.

- **Sterling Pl Water Main Replacement (R17-02B2.21-P-0110)**

This project installs approximately 1,450 feet of 8-inch ductile iron water main replacing the existing 6-inch cast iron water main. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement will increase the service reliability and improve fire flows and service pressures for the customers in the service area.

- **Country Life Acres Water Main Replacement Ph 2 (R17-02B2.21-P-0293)**

This project installs approximately 2,900 feet of 12-inch ductile iron water main replacing 6-inch cast iron water main. The pipe size will be increased due to high head loss in this service area. This project addresses recurring breaks and the general deterioration of the existing water main which would cause damage to the planned roadway work. This main replacement increases the service reliability and improves fire flows and service pressures for the customers in the service area.

- **Washington and Elizabeth Water Main Relocation (R17-02D1.18-P-0039)**

This project includes the installation/relocation of approximately 400 feet of 16-inch ductile iron main bored under I-270 just east of the Washington/Elizabeth intersection. Installation/relocation of approximately 450 feet of 12-inch ductile iron main from Knollstone Drive west to 3690 Pershall Road along with associated appurtenances and water services. Installation of approximately 50 feet of 8-inch ductile iron main on Summer End Drive to connect the existing 8-inch ductile iron main to the existing 6-inch PVC water main on Grandview Drive to maintain and increase fire flows in this area due to the abandonment of the existing 16-inch water main along Dunn Road. This portion includes the abandonment of approximately 6,000 feet of 16-inch main, approximately 955 feet of 6-inch main and approximately 610 feet of 12-inch main east of Washington/Elizabeth intersection. The installation of the facilities listed above will relocate a 12-inch water main crossing under I-270 and two – 6-inch water main crossings under I-270. This also allows for the abandonment of approximately 275 feet of 6-inch cast iron main on Grandview Drive.

- **Manchester Rd Water Main Relocation (R17-02D1.19-P-0022)**

  This project will relocate approximately 880 feet of 20-inch ductile iron main, approximately 50 feet of 16-inch ductile iron water main, approximately 375 feet of 8-inch HDPE water main by a directional bore at Manchester and Hanley Rd., approximately 715 feet of 8-inch ductile iron water main, approximately 75 feet of 6-inch ductile iron water main and approximately 10 feet of 4-inch ductile iron water main along with associated appurtenances and water services on the Manchester Road corridor between Lindbergh Boulevard and Big Bend Road. The relocation of the facilities is due to conflicts with the Missouri Department of Transportation project along Manchester Road.

- **New Florissant Rd Water Main Relocation Phase 1 (R17-02D1.20-P-0036)**

  This project includes the installation/relocation of approximately 620 feet of 20-inch HDPE water main installed as a bore under I-270 at new Florissant Road, approximately 530 feet of 20-inch ductile iron water main, approximately 720 feet of 12-inch ductile iron water main, approximately 170 feet of 8-inch ductile iron water main and approximately 215 feet of 6-inch ductile iron water main along with associated appurtenances and water service lines. The crossing on I-270 will allow MAWC to eliminate three 8-inch and one 12-inch main crossings and install one 20-

inch crossing. This also allows for maintaining fire flows on the south side of I-270. The relocation of the facilities is due to conflicts with the Missouri Department of Transportation project along the I-270 corridor.

- **West Florissant Rd Water Main Relocation (R17-02D1.20-P-0037)**

  This project includes the installation/relocation of approximately 1,500 feet of 30-inch ductile iron water main, approximately 15 feet of 24-inch ductile iron water main, and approximately 80 feet of 8-inch ductile iron water main along with associated appurtenances along Pershall Road from West Florissant Road westwardly. This relocation will allow the abandonment of one 6-inch and one 24-inch water main crossing into one single 30-inch water main crossing west of West Florissant. The relocation of the facilities is due to conflicts with the Missouri Department of Transportation project along the I-270 corridor.

- **Warrensburg Culton Water Main Replacement (R17-06B1.21-P-0004)**

  The Culton Street water main replacement consists of replacement of approximately 3,200 feet of 4-inch main with new 8-inch main along Culton St from N. Water Street east to N. Holden. The 4-inch main has a history of breaks, is under the pavement of Culton street, and has fire hydrants on the 4-inch pipe that could not supply adequate flow.

- **Jefferson City Industrial Dr Water Main Replacement Phase II (R17-12B1.21-P-0004)**

  The Jefferson City Industrial Drive Water Main Replacement Phase II project includes the replacement of 3,506 feet of 12-inch PVC, 313 feet of 12-inch ductile iron pipe, 588 feet of 8-inch PVC, 10 feet of 8-inch ductile iron pipe, 45 feet of 6-inch PVC, 10 feet of 16-inch PVC, and 8 feet of 10-inch ductile iron pipe on Industrial Dr in Jefferson City. Main replacement is prioritized due to high break rates and a need to improve fire flow through the previous 10” DI main. Project timing is being coordinated with a City of Jefferson roadway project.

- **El Chaparrel Main Connection to Cedar Hill WWTP (I17070004)**

  Missouri American Water has an Abatement Order on Consent with MDNR to discontinue flow from the El Chaparrel Lagoon WWTF and connect it to another system so the lagoon can be closed. The El Chaparrel Lagoon is a 2 cell nonaerated lagoon and would require major capital improvements in order to comply with MDNR effluent permit ammonia limits. This project will connect the El Chaparrel collection system to the Cedar Hill Lagoon system.

- **Incline Village Wastewater Plant #1 Expansion (HRAM 3-4) (I17150002)**

  Incline Village WWTF #1 consists of a 60,000 gpd and a 20,000 gpd extended aeration treatment trains. The 20,000 gpd train is in disrepair and unable to be put in service. The 60,000 gpd facility is now overloaded and has metal structural components that are failing. The new treatment facility will be a single 80,000 gpd concrete structure and necessary appurtenances.

- **Maplewood WW Lift Station Replacements (I17260003)**

  The existing lift stations in the Maplewood sewer system are approximately 55 years old and are in poor condition. The pumps, vacuum system, suction pipes and supports need to be replaced. This project consists of replacing them with submersible pumps retrofitted into the existing wetwells.

- **Rogue Creek Wastewater – Replace Lift Stations #1 & #2 (I17500002)**

The purpose of this project is to mitigate challenges with stormwater entering the sanitary system during rain events. The system does not have the capacity for this wet weather flow. This project will replace two existing substandard lift stations with a single duplex pumping system that has adequate capacity. This lift station is in close proximity to Lake Four Winds. Additionally, this project will replace the collection system from Lift Station #2 to the retired Lift Station #1 so that this flow will enter the existing collection system just upstream of the treatment plant.

- **Arnold Wastewater Collection System Improvements (R17-40B1.21-P-0002)**

  This project will replace approximately 2,900 feet of 8-inch gravity sewer with new cured in place pipe and 1,425 feet of 15-inch gravity sewer with new cured in place pipe. The project will reduce inflow and infiltration in the Arnold sewer system, avoiding sewer backups and lowering the total flow during wet weather events in the system.

- **Rogue Creek Wastewater Collection System Replacements Phase 2 (R17-50B1.21-P-0003)**

  The Rogue Creek Wastewater Collection System Replacements Phase II project will replace approximately 2,800 feet of defective 8-inch gravity sewer main with 2,780 feet of new 8-inch PVC sewer main and 20 feet of 8-inch ductile iron sewer main. The project included replacement of 12 manholes in the alignment. The project will reduce I/I in the Rogue Creek collection system as determined by various tests and inspections.

- **Enterprise Solutions (R17-01K3)**

  Enterprise Solutions investments consist of recurring investments in hardware, software, and related appurtenances that provide the core information technology systems infrastructure across of all of the American Water enterprise for use by the Service Company and all American Water regulated subsidiaries, including MAWC.

Q. Please describe the significant capital projects planned to be in service during the period January 1, 2023 through May 31, 2023.

A. The significant capital projects planned to be in service are as follows:

- **Meramec Plant Update Electrical Systems Phase 1 (I17020107)**

  The High Service Switchgear for Basins B, C & D has reached the end of its useful life. A new, more reliable, and safer to operate electrical gear is needed. This project replaces the high service switchgear/motor control center for high service pumping on basins B, C, & D. In addition, emergency backup generators will be added for the C & D basin high service pumps to provide reliable customer service during a power outage.

- **Central Plant New RDP Lime Slaker (I17020198)**

  This project will add an additional lime batch tank and loop piping feed system to deliver lime to the treatment basins. The Central Plant lime feed system is at maximum capacity without a reliable backup to feed the required lime dosage on peak days. An additional lime slaker and a larger pipe delivery system will increase the reliable capacity of the feed system to meet peak demands.

- **Warrensburg Ozone (O3) Replacement (I17060007)**

  The Warrensburg WTP existing Ozone generating system is 20-years old and contains parts that are no longer supported by the manufacturer. This project will replace the Ozone system with a modern, more efficient Ozone generating system. The Ozone system is needed to eliminate the sulfide compounds in the well water.

- **Meramec Wastewater Plant Influent Screen (I17300002)**

The Meramec Wastewater Plant has an ongoing issue with rags clogging the treatment train. This creates significant operational challenges at the wastewater treatment plant with safety in removing material and with meeting effluent discharge limits in our operating permit. This project is designed to eliminate the issue by installing an influent screen and grinder system at the head of the plant to remove the rags and disposable wipes from the collection system.

- **Enterprise Solutions (R17-01K3.XX)**

  MAWC continues to invest in its core information technology systems infrastructure, including upgrades and enhancements to our existing foundational technologies. In addition, our continuing Enterprise Solutions investments support the development of a services framework that integrates MAWC's foundational technologies, applications, and third-party hosted services. Please see the Direct Testimony of Jeff Kaiser for a discussion of some of the operational technologies supported by these investments.

Q. Are any costs associated with the Joplin Reservoir project included in the Company's proposed revenue requirement in this case?

A. No.

IV. WATER STORAGE TANK REHABILITATION

Q. What are water storage tanks?

A. In terms of a potable water system, water storage tanks are reservoirs typically located at a water treatment plant or within the distribution system. These reservoirs hold potable water so that it is available to meet short-term customer demands that may exceed the instantaneous capacity of the water treatment facility or the distribution system. These tanks are constructed of steel or concrete and are generally classified as ground storage tanks, standpipes, or elevated storage tanks. Each interacts with the water distribution systems through their unique hydraulic properties but serve the same general purpose of holding water for our customers.

Q. Why are water storage tanks critical to the operation of water systems?

A. Unlike electric power generation, water treatment plants are not constructed to meet instantaneous peak demands of the customers. Water storage tanks are the key piece of infrastructure that allows water systems to meet peak demands and provide significant cost savings in the design and construction of water treatment facilities. They accomplish this by acting like a battery for the water systems, storing water treated during non-peak usage periods that is then returned to the system for use during peak usage periods. MAWC is able to save on energy costs by pumping the tanks full when electricity costs are less and ramping down on pumping when electric costs are higher. Peak demands can result from typical customer usage patterns, which may be one or two times greater than the average rate of usage, or from emergencies such as firefighting which may be many times greater than typical potable water usage. These tanks also provide a backup supply of water in the event of a main break or other interruption in the production or distribution of potable water, helping to maintain service until the problem can be resolved. Without adequate storage, periods of low pressure and boil orders due to low pressure conditions would be common, interruptions of service would be much more frequent, and treatment plants would have to be constructed much larger to meet these peak demands.

Q. Please describe the Company's steel water storage tank refurbishment program.

A. MAWC currently owns and operates 111 steel water storage tanks across the Company's service areas. These tanks range in size from 8,000 gallons to 11,000,000 gallons. The integrity of these structures is crucial to protecting public health and providing safe, clean, and reliable water service to customers. To maintain that integrity, the Company invests approximately $2 million to $3 million each year for water storage tank refurbishment which significantly extends the service life of these critical distribution system assets. These refurbishment investments may include the replacement or repair of corroded steel components, the addition of safety and security upgrades such as new access ladders and manways, the replacement of vents and overflows, and the renewal or replacement of existing coating (paint) systems. This work is followed by disinfecting the tank and returning the tank to service. This work is bid to qualified licensed contractors, inspected during and after the performance of the work, and inspected again after a one-year warranty period to verify that the coatings were properly applied and are performing as specified.

The program entails periodic detailed inspection of the interior and exterior structure of the tanks and a prioritization to determine the annual program. Depending on service conditions and other variables, this entire refurbishment routine is repeated on a 15 to 20-year cycle for each tank, as that is the expected lifespan of the coating systems utilized in the refurbishment.

Q. Please describe the service life considerations for steel water storage tanks in distribution systems.

A. Steel water storage tanks can be configured as ground-level storage tanks, elevated tanks, or standpipes. Currently, MAWC has 111 steel tanks in inventory. More than one-third of these tanks have been in service for more than 50 years. The oldest was originally constructed in 1936 and has been in service for more than 80 years. A complete listing of MAWC's steel water storage tanks is included in Schedule RBL-2. If properly designed, constructed, and refurbished on a regular basis, these tanks can be expected to have service lives of well over 50 years and approaching 100 years despite exposure to harsh environmental conditions. If not properly refurbished, a steel tank may last no more than 30 years. Most of these tanks are exposed to a wide range of air temperature, humidity, water temperatures, wind loading, and seasonal weather conditions. Steel tanks need to be protected from exterior corrosion that can result from the harsh outdoor environment and interior corrosion that can result from the effects of chlorinated water. Interior corrosion is a special problem for areas where winter ice formation in the tank can damage the steel and coating systems. Corrosion, if left unattended, can lead to structural damage and leaks, as well as poor aesthetic conditions. These damaged areas can potentially result in a breach of the tank, which can lead to contamination of the tank contents from infiltration. Under severe circumstances, tank structural failure can occur. Proper inspection, ongoing routine care to address spot corrosion, and major refurbishment projects can therefore extend the service life of steel tanks.

Q. Please describe the importance of structural steel coating systems.

A. As discussed, steel tanks require occasional but significant investment in the protective coating system. MAWC utilizes a high-performance engineered coating system on both interior and exterior surfaces of tanks. The service life of the interior and exterior coatings varies depending upon several conditions, but typical high-performance coatings can last from 15 years to about 20 years. Installation of new coating systems on existing tanks typically requires removal of existing coatings to bare metal through abrasive blasting and then installation of a new, three-coat engineered coating system that will protect the structural metal and extend its useful life significantly. Work site containment systems are often constructed around the tank to control dust and overspray during abrasive blasting and the application of coatings. Some existing steel structures may have previously been coated with lead-based paint systems. For those facilities, the project activities are supplemented with lead abatement efforts to contain, collect, and properly dispose of possible lead-based residuals to protect workers, neighboring properties, the general public, and the environment.

Q. Have Engineered Coating Systems proven their value in protecting the Company's investment in tanks?

A. Yes. More than one-third of MAWC's storage tanks were built prior to 1970 and have been in service for more than 50 years. Our oldest tanks have been in service for more than 80 years. These tanks would have failed or required extensive structural repairs without the installation, maintenance, and regular refurbishment of effective coating systems.

Q. How many tanks will reach or exceed a 20-year coating life between 2020 and 2030?

Approximately one-half of the Company's storage tanks either have or will have reached or exceeded a 20-year coating life between 2020 and 2030. Many of these tanks have been inspected or will be scheduled for inspection and based on the results of the inspection will be scheduled for repair or refurbishment during this timeframe.

Q. Please discuss any new innovations in tank coating systems.

A. Over time, the industry has provided significant innovation. From the introduction of polyurethane coatings to organic zinc-rich primers, to the development of fluoropolymer coatings and Volatile Organic Carbon (VOC) free coatings, these innovations extend the lives of the tank coating systems, meet current environmental and safety regulations, and help with aesthetic properties such as reducing color fading and retaining a high gloss durable finish for an extended period of time. The latest innovations allow for coating of tanks during periods of cold weather. While tanks can be more easily removed from service during cold periods due to lower water demands, the coating technology did not allow for application during colder temperatures. This latest innovation will allow more tanks to be coated during the off-peak demand season. The current window available for performing this work falls during higher demand periods (summer) and, in many instances, does not allow for tanks to be removed from service.

Q. How are the tank rehabilitation projects prioritized?

A. Capital improvements and maintenance activities for tanks (e.g., engineered coating replacements, surface cleaning, etc.) are prioritized based on inspection results and projected service lives. Notwithstanding this prioritization of the tanks in most urgent need of rehabilitation, MAWC estimates that it will need to rehabilitate the entire inventory of 111 steel water storage tanks, as well as any tanks added through acquisitions, over the next 20 years, or an average of about five to six tanks per year.

Q. Please discuss the cost to rehabilitate these tanks over the next five years.

A. Over the next five years, the estimated total cost to rehabilitate 25 to 30 steel water storage tanks is between $10 million and $15 million.

Q. What factors are taken into consideration when determining this cost?

A. The cost to rehabilitate a tank can vary greatly based on size, type of construction, physical condition and damage, site constraints and working room, environmental considerations, and other factors. The detailed tank inspections and subsequent reports and recommendations will weigh heavily in determining the actual tank rehabilitation needs and priorities. Further, any operational considerations may drive up costs. For instance, small systems that may have only one storage tank may require the use of portable hydropneumatic tanks to maintain pressure and safe operation of the system while the storage tank is out of service. These tanks are typically rented and temporarily piped to the distribution system to help address instantaneous changes in demand that cannot typically be addressed through pumping alone.

Q. Does the Company have detailed inspection reports, bids or other materials to support the cost of tank rehabilitation?

A. Yes. The Company is required by the Missouri Department of Natural Resources to inspect each water storage tank on a three-to-five-year cycle. The Company has numerous detailed inspection reports that include cost estimates for necessary refurbishment. Copies of the recently completed reports for Mexico West and Baxter Road tanks have been included in Schedule RBL-3 as examples of typical reports.

Q. Are plans and specifications for bidding purposes prepared for these projects?

A. Yes. Plans and specifications are prepared for bid.

Q. And were bids solicited and received for the projects planned for 2022?

A. Yes. As of June 30, 2022, the Company received detailed bids for seven tanks for projects in 2022 and 2023. The anticipated costs for the rehabilitation of these tanks are as follows:

Tank Name	**MAWC District**	**Project Budget**	**Project Year**
Mehlville #3	St. Louis County	$608,286	2022
Lake Taneycomo	Branson Metro	$202,380	2022
Incline Village	St. Charles	$127,400	2022

Tank Name	MAWC District	Project Budget	Project Year
Fee Fee	St. Louis County	$1,348,500	2022
Carman	St. Louis County	$926,000	2023
Sappington #1	St. Louis County	$449,000	2023
S. 22nd Street	St. Joseph	$470,280	2023
	TOTAL	**$4,131,846**	

Q. How does the Company currently record costs incurred for engineered tank coating systems?

A. When refurbishing engineered tank coating systems, the Company currently expenses those costs.

Q. Is the Company requesting the Commission authorize a different treatment for engineered coatings in this case?

A. Yes. The Company is proposing to capitalize investments in Engineered Coatings in NARUC account 342, and to depreciate those assets over 20 years. This proposed treatment is on a prospective basis, beginning with the effective date of rates in this case.

Q. Has the Company capitalized these costs as part of this rate case?

A. No. The Company has included $2,065,923 in maintenance expense to reflect the annual average costs of the 2022 and 2023 refurbishments listed above.

Q. If the Commission approves capitalization of Engineered Coating investments, would the Company adjust any components of this filing?

A. Yes. If the Engineered Coatings are capitalized, then the Company would reduce maintenance expense by $2,065,923.

Q. Why should this rehabilitation work be considered capital expenditure?

A. The rehabilitation of water storage tanks is essential to extending the life of a critical water system asset, the storage tanks. Without this work, the structural and environmental integrity of tanks would degrade quickly after the initial coating systems begin to fail and the service life of the tanks would be much shorter. Significant risk to the service level and safety of our customers would be introduced as these assets deteriorate. Similar to other capital work on long-lived assets such as the rehabilitation of a high-service pump, the tank coating has a significant service life of 15 to 20 years of its own and it maintains the continued functioning of the original asset. Lastly, the rehabilitation is a significant expenditure and can be individually accounted for, tracked, and depreciated at a specific location in the Company's property records.

V. RISKS OF PROVIDING PUBLIC WATER & WASTEWATER SERVICES

a. Public Water Supply Service

Q. Please provide an overview of the risks associated with furnishing safe and adequate water quantity and water quality and complying with drinking water and environmental regulations that apply to MAWC's water supply facilities and operations.

A. Water supply utilities are subject to a complex array of regulations at the federal, state, and local levels with respect to water quantity, water quality, and other environmental aspects of their facilities and operations.

With respect to water sources and the quantity of water that can be withdrawn, Missouri in general does not currently suffer serious constraints on its supply of usable water. However, that assessment does not apply uniformly to all parts of the state. Limited surface water supplies, the legacy of mining and other industrial activities, run-off from agricultural land use, depleting ground water sources, brackish (saline) groundwater, and contamination of groundwater with various compounds such as hydrocarbons from fuel supplies, and perchloroethylene (PCE) or trichloroethylene (TCE) used in dry cleaning and metal degreasing, create challenges to obtaining adequate supplies of water in various areas of Missouri.

These factors add to the costs of treating existing water sources as well as the costs and uncertainty of obtaining new or increasing existing water resources to meet new demand. These are additional risk factors that directly affect MAWC's ability to furnish safe, clean, and reliable service, and can potentially increase the costs MAWC incurs to provide that service.

Drinking water quality is controlled by a combination of federal regulation established under the Safe Drinking Water Act of 1973 and state regulation under the Missouri Safe Drinking Water Act. The federal act established the EPA as the federal regulatory authority on drinking water. Under that authority, EPA has created standards for contaminant levels in drinking water[1] and a series of mandatory treatment method standards, coupled with monitoring and reporting requirements, and public notification mandates, in the event of contaminant level or treatment method non-compliance.[2] In turn, Missouri has adopted the federal regulatory standards, plus certain other rules, which are administered by the Missouri Department of Natural Resources (MDNR).

In recent years, there has been an increase in public concern over potential contaminants

[1] See: https://www.epa.gov/sdwa/drinking-water-regulations-and-contaminants#List
[2] See 40 C.F.R. Parts 141-143.

that laboratories can now identify at levels that, in the past, could not be detected, and which research suggests might have health effects. The EPA and state drinking water regulators have responded by increasing their own research and, in some cases, imposing or proposing more stringent regulatory standards. In other cases, where regulators have not provided clear guidance on either the risks involved or how water suppliers should respond, there has been an increase in public concern that is driving public demand for significantly higher levels of water treatment that the existing science does not warrant. An example of this dynamic exists with the family of compounds known as per- and polyfluoroalkyl substances (PFAS), which include the chemicals perfluorooctanesulfunic acid (PFOS) and perfluorooctanoic acid (PCOA). These chemicals, which had a number of commercial applications, have generated interest in the popular press that, in turn, has raised concerns by the public generally.

The Company is monitoring these situations and intends to proceed cautiously based on the best available information and prepare to achieve treatment levels for PFAS compounds that can reasonably be anticipated based on current research and actions contemplated by regulators. Concern over PFAS compounds is a current example of how evolving research and regulatory responses can drive the need for higher levels of treatment and impose demands for increased investment in new and more intensive forms of treatment. Furthermore, the fact that these regulatory demands are, in effect, a "moving target" for water suppliers make them another significant risk factor for MAWC.

The EPA has continued to make its regulations concerning disinfection byproducts more stringent. Disinfection byproducts are produced by the interaction of disinfection agents (such as chlorine) with constituents (such as organic compounds) that naturally occur in source water. The Stage 2 Disinfectants and Disinfection Byproducts Rule adopted in 2006, coupled with increasingly stringent disinfection regulations, requires a very careful balancing of treatment processes and source water monitoring to meet the twin goals of killing microbes (such as giardia and e-coli) while avoiding unacceptable concentrations of disinfection byproducts such as chlorite, bromate, trihalomethanes, and halogenic acetic acids. These evolving standards require the Company to evaluate and modify its treatment processes, which, in turn, requires the Company to invest in new plant and equipment to enable revised disinfection treatment methods. This is another example of the need for the Company to study, monitor, and comply with new and evolving standards that are accompanied by higher costs and increased demands for new investment.

Q. Please provide an overview of MAWC's efforts to address removal of lead service lines?

A. As a result of conditions that arose in Flint, Michigan and other jurisdictions across the country, there is increasing scrutiny by all levels of government of the presence of lead in the water customers use and consume. As a result, legislatures and regulators are focused on adopting more stringent requirements for enforcing the federal "Lead and Copper Rule." The lead problem does not typically arise from constituents in the water that a supplier introduces to its distribution system, but rather from lead that leaches into the water from customer service lines made of lead and from homeowners' interior piping that is joined by lead solder. Both conditions are commonly present in older homes.

While controlling the corrosivity of the water can, in many cases, avoid excessive lead concentrations, in many older communities (such as those throughout much of MAWC's service territory), customers have lead service lines and interior piping that contains the type of copper and galvanized pipes with solder joints that raise the risk of lead contamination. Recent class-action litigation against the City of Chicago and other similar litigation involving the presence of lead service lines have become an industry-wide concern. As explained below, the Company has instituted a program to proactively reduce the risks associated with the presence of lead in customers' drinking water.

Significantly, proposed revisions to the Lead and Copper Rule are currently pending before the EPA for approval. The proposed revisions would include a mandate that water systems replace lead service lines and, as part of that mandate, would require water suppliers to "encourage [customers] to share appropriately in fully removing [lead service lines] …." This proposal reflects the fact that, in many jurisdictions (including Missouri) the water supplier typically owns the portion of the service line from its main to the curb box or meter located at the property line, while the customer owns the service line from the property line to the customer's point of use. Because of that division in ownership, EPA acknowledges that its proposal raises "substantial economic, legal, technical, and environmental justice challenges." EPA's proposed changes would also require more stringent corrosion control treatment and lower the permitted levels of lead and copper at the customer's tap.

The Company, using authority granted by the Missouri Public Service Commission, has initiated a program that addresses the concerns addressed by the EPA about the presence of customer-owned lead service lines. Under its program, the Company replaces customer-owned lead service lines across its service territory at no direct cost to the customer and without MAWC taking ownership of the new service line traditionally owned by the customer. The Company has also implemented initiatives to educate its customers about the risks of lead in drinking water and provides them the information they need to participate in the Company's customer-owned lead service line replacement program.

The Company is at the forefront of the water industry in proactively eliminating the risks that might accompany the presence of lead service lines. However, these efforts also require the dedication of management time and resources and the commitment of significant investment of capital to achieve the intended results. These factors, in addition to the demands the Company already faces to rehabilitate, replace, and enhance aging infrastructure and meet evolving regulatory demands, add to risk factors that MAWC faces as it works to provide safe, adequate and reliable water service.

<u>b. Public Wastewater Service</u>

Q. Provide an overview of the risks that environmental regulation poses for MAWC as the owner and operator of public wastewater systems.

A. Like the provision of public water supply service, the operation of wastewater collection and treatment systems entails a range of environmental regulatory risks.

Wastewater operations are also regulated at both the federal and state levels pursuant to several statutes and voluminous regulations. At the federal level, wastewater systems are regulated pursuant to the Clean Water Act and numerous regulations adopted by the EPA under that law. At the state level, the MDNR has adopted and enforces those standards under the Missouri Code of State Regulations Title 10, Division 20. These regulations set standards and requirements for virtually every aspect of wastewater system operation.

One risk associated with operating wastewater systems is that effluent limitations imposed on WWTP discharges are stringent and can become more stringent over time. The Clean Water Act requires wastewater systems to obtain and comply with National Pollutant Discharge Elimination System (NPDES) permits, which, in Missouri, are issued by

MDNR. NPDES permits establish stringent effluent limits based upon the stricter of: (1) technology-based effluent limits; and (2) water quality-based effluent limits.

Technology-based limits are set by EPA (or, in the absence of EPA guidelines for effluent limits, by the permit writer's best professional judgment) at levels that reflect (depending on the parameter) best conventional control technology (BCT), best practicable control technology currently available (BPT), or best available technology economically achievable (BAT). Determinations of BCT, BPT and BAT can change over time, becoming more stringent as technology evolves.

Water quality-based effluent limits (WQBEL) are established to avoid discharges to water bodies that exceed instream water quality criteria, which are set to protect existing and designated uses, such as recreation and various categories of fisheries. WQBEL limits are usually based on the assimilative capacity of a stream to receive and dilute the discharge during extremely low flow – that is, when stream flow is at the 7-day, 10-year low flow (Q7-10). By definition, WQBELs may require treatment beyond technology-based values, even beyond what is considered best available technology. Moreover, as streams become cleaner, there exists a possibility that their classifications may be upgraded such that their protected uses are deemed to be more sensitive, which, in turn, leads to even more stringent WQBEL calculations.

As just one example, many of the Company's small wastewater treatment systems are now required to meet ammonia discharge limits. A notable risk in wastewater operations is that limits for some parameters may have conflicting impacts on treatment efforts or may not be attainable with existing treatment systems. Such is the case with respect to fecal coliform standards on the one hand, and limits on treatment residuals (residual chlorine and dichlorobromomethane) on the other – where a delicate balancing is required to concurrently meet all applicable standards.

Thus, more stringent effluent limits may be imposed when technology evolves or stream conditions change, engendering requirements for significant capital improvements and/or increased operating costs for enhanced treatment performance. Every five years, NPDES permits are up for renewal, and in any such renewal more stringent limits may be triggered.

Another risk for MAWC is that a number of Missouri streams, including those where MAWC is operating wastewater systems, are parts of watersheds that are classified as "impaired" (meaning their instream quality does not meet state standards). Such impaired waters are subject to the development and imposition of Total Maximum Daily Loads (TMDLs) for parameters that contribute to the instream conditions. Where TMDLs are established by EPA or MDNR, stringent waste load allocations are made to point-source discharges (such as WWTPs), and allocations are also made to non-point sources, such as agriculture and urban runoff. Where any cap loading exceedance irrespective of the cause (such as increased flows and loadings from system customers or high stormwater flows entering the system) – can potentially lead to penalties and other enforcement actions.

Wastewater systems also face significant regulatory and environmental liability risks. Non-compliance with wastewater system effluent limits and other permit conditions can result in severe penalties. Regulatory violations expose the operator to the risk not only of governmental agency enforcement actions, but also of citizen suits in which both injunctive relief and civil penalties can be imposed.

Other potential liability risks from wastewater system operations arise from backups, overflows or releases that may occur from the collection system onto private property or into the environment. As an example, some wastewater system operators have been confronted with claims under the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for cleanup of contamination that occurred when wastewater containing "hazardous substances" leaked from sewer lines into soils or groundwater. While not as extreme, liabilities resulting from wastewater backups into buildings or other unplanned discharges are an inherent part of wastewater system risks.

c. Challenges Climate Change May Create

Q. Does climate change pose additional risks for water supply and wastewater system utilities such as MAWC?

A. Yes. Whatever the causes of climate change may be, water supply and wastewater utilities face the reality of changing climatic conditions and attendant stresses on water resources. Although climate models for the midwestern U.S. generally predict overall annual precipitation amounts to remain similar to average historic experience, the EPA has indicated a likelihood for increasingly intense storms and repeated, extended dry periods are anticipated.[3] That means we can expect more droughts of varying degrees of severity and more frequent and intense high-flow events and floods – all of which impact water and wastewater utilities.

Water supply systems are fundamentally resource-dependent and, therefore, the effects of climate change pose a significant on-going risk and create challenges with regard to maintaining a reliable water supply during the full range of potential future conditions, including even what might be assumed to be "normal" periods. The safe yields of water supply sources have historically been evaluated based on historical climatic patterns, data

[3] https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-mo.pdf

from so called “droughts of record” or dry period frequency analysis. However, changing climatic conditions suggest that historical hydrologic data (which in many cases only reflect 50-100 years of rainfall and stream flow measurement data collection – a quite short period in geologic or climatic time) may not accurately predict future conditions. Thus, the calculated safe yield of streams, reservoirs and groundwater wells are put in question as the effects of climate change are experienced across the midwestern United States. Thus, in response to climate change, water supply systems must address the risks posed to the reliability and resilience of their sources.

While droughts are the major challenge for water supply systems, heavy precipitation and high-flow events are the concern of wastewater systems. As mentioned previously, wastewater systems of all types are impacted by storm water – directly in the case of combined sewer systems and indirectly (but nevertheless significantly) by I&I in “sanitary only” systems. The prediction of increased intensity of strong storms and high rainfall events in the midwestern United States portends challenges to wastewater systems which must, in turn, cope with and treat higher peak flows while avoiding exceedance of effluent limitations and reducing the potential for untreated overflows. An additional challenge related to high intensity rain events is higher levels and frequency of flooding. Flooding has the potential to impact both water and wastewater treatment facilities which are often located in proximity to water ways.

Q. Does this conclude your Direct Testimony?

A. Yes.

<u>Schedule RBL-1</u> has bee marked CONFIDENTIAL in its entirety in accordance with Commission Rule 20 CSR 4240-2.135(2)(A).4 and 6**.**

System	Title	Capacity (MG)	Tank Style	Use	Material	Diameter	Height	Last Ext Painting	Last Int. Painting	Year Erected
Joplin	32nd St	2	Ground Storage	Finished Water Distribution	Steel	102	33	2011	2011	1997
Joplin	4th St (elevated)	1	Elevated	Finished Water Distribution	Steel	67	108	2010	2010	1962
St. Louis County	Affton #2 (dome)	1.52	Ground Storage	Finished Water Distribution	Steel	72	50	2013	2016	1953
St. Louis County	Affton #3	4	Ground Storage	Finished Water Distribution	Steel	177	50	2020		1967
St. Joseph	Agency	0.07	Standpipe	Finished Water Distribution	Steel	10	120.5	2018	2018	
St. Charles	Anna Meadows	0.15	Standpipe	Finished Water Distribution	Steel	15	114	2018	2018	2018
St. Louis County	Baxter	8	Ground Storage	Finished Water Distribution	Steel	175	45	2015	2015	1968
Brunswick	Brunswick Brunswick Hill	0.1	Elevated	Finished Water Distribution	Steel		67	2006	2006	1963
St. Louis County	Carman	4	Ground Storage	Finished Water Distribution	Steel	117	50	2008	2008	1975
St. Louis County	Cherry Hills	4	Ground Storage	Finished Water Distribution	Steel	117	50	2014	2014	1987
Lawson	City Park Tank	0.05	Elevated	Finished Water Distribution	Steel		117.167			1955
St. Louis County	Clayton	2.54	Ground Storage	Finished Water Distribution	Steel	116	32	2020	2012	1962
Wardsville	Elevated	0.5	Elevated	Finished Water Distribution	Steel		128			1999
Wardsville	Well 2 Clearwell	1	Ground Storage	Finished Water Clearwell	Steel	102	18	2006	2006	1984
Jefferson City	Clearwell 2	1	Ground Storage	Finished Water Clearwell	Steel	102	18	2006	2006	1984
St. Louis County	Crestview	0.5	Elevated	Finished Water Distribution	Steel		146	2016	1998	1998
Parkville	Crooked Rd	0.5	Ground Storage	Finished Water Distribution	Steel	52	32	2006	1997	1969
Joplin	Crossroads	1	Hydropillar	Finished Water Distribution	Steel		140	2003	2003	2003
St. Charles	Ehlmann Rd	0.5	Ground Storage	Finished Water Distribution	Steel	35	41	2006	2006	1964
Joplin	Eland	0.4	Single Ped	Finished Water Distribution	Steel	51.5	136	2006	2006	2005
Jefferson City	Ellis	1.5	Ground Storage	Finished Water Distribution	Steel	105	25	2004	2004	2004
Emerald Point	Emerald Point	0.175	Standpipe	Finished Water Distribution	Steel	15.83	110	2015		1994
St. Louis County	Fee Fee	8	Ground Storage	Finished Water Distribution	Steel	172	46	2012	1995	1966
St. Louis County	Ferguson (elevated)	0.25	Elevated	Finished Water Distribution	Steel		143	2016	2016	1939
St. Louis County	Florissant	2.5	Ground Storage	Finished Water Distribution	Steel	110	35	2014	2000	1961
St. Louis County	Foerster	4	Ground Storage	Finished Water Distribution	Steel	117	50	2013	2013	1968
St. Charles	Harvester Rd (1.5MG)	1.465	Standpipe	Finished Water Distribution	Steel	50	100	2009	2009	1977
St. Charles	Harvester Rd (3.5MG)	3.5	Standpipe	Finished Water Distribution	Steel	78	99	2009	2009	1990
St. Louis County	Hawkins	2.46	Ground Storage	Finished Water Distribution	Steel	92	50	2019	2019	1968
St. Louis County	Hazelwood #1 (dome)	4	Ground Storage	Finished Water Distribution	Steel	120	47	2019	2019	1960
St. Louis County	Hazelwood #2	4	Ground Storage	Finished Water Distribution	Steel	118	49	2000	2000	1965
Joplin	Hill St	1	Ground Storage	Finished Water Distribution	Steel	66	40	2006	2006	1980
St. Joseph	Huntoon Rd #1	3.3	Ground Storage	Finished Water Distribution	Steel	110	40	2018	2008	
St. Joseph	Huntoon Rd #2	4	Ground Storage	Finished Water Distribution	Steel	117	50	2013	2014	
Lawson	Hwy 69 Tank	0.3	Elevated	Finished Water Distribution	Steel	45	93.583			1984
Incline Village	Incline Village	0.2	Elevated	Finished Water Distribution	Steel		91	2021	2021	2005
St. Joseph	Industrial Park	1	Elevated	Finished Water Distribution	Steel		137	2011	2011	
St. Charles	Jaxson Estates	0.585	Standpipe	Finished Water Distribution	Steel/Bolted	29	12			2007
St. Joseph	Karnes Rd	0.75	Elevated	Finished Water Distribution	Steel		115	2010	2010	
St. Louis County	Kehrs Mill #1 (elevated)	0.25	Elevated	Finished Water Distribution	Steel		102	2017	2017	1955
St. Louis County	Kehrs Mill #2 (dome)	2.46	Ground Storage	Finished Water Distribution	Steel	92	50	2012	2012	1960
Woodland Manor	Kimberling City Cardinal Ln	0.018	Standpipe	Finished Water Distribution	Steel	10	18.33	2016	2016	2016
St. Joseph	King Hill #1	2	Ground Storage	Finished Water Distribution	Steel	100	35	2019	2006	
St. Joseph	King Hill #2	2	Ground Storage	Finished Water Distribution	Steel	100	35	2018	2006	
Lake Carmel	Lake Carmel	0.226	Standpipe	Finished Water Distribution	Steel	8	100			2003
Lake Taneycomo Acres	Lake Taneycomo Acres	0.034	Standpipe	Finished Water Distribution	Steel	12	36			
Lakewood Manor	Lakewood Manor	0.012	Ground Storage	Finished Water Distribution	Steel	12	30			2003
St. Joseph	Landis Rd	0.06	Standpipe	Finished Water Distribution	Steel	10	110.6	2012	2012	
Maplewood	Maplewood	0.0865	Standpipe	Finished Water Distribution	Steel	11	120			
St. Louis County	Mehlville #2 (dome)	2	Ground Storage	Finished Water Distribution	Steel	75	60	2016	2016	1956
St. Louis County	Mehlville #3	2	Ground Storage	Finished Water Distribution	Steel	75	60	2016	1994	1970
Mexico	Mexico West Tank (elevated)	0.25	Elevated	Finished Water Distribution	Steel	40	110	2006	2006	1988
St. Louis County	Norwood	2.46	Ground Storage	Finished Water Distribution	Steel	92	49	2020	2020	1963
St. Louis County	Oakville #1 (elevated)	0.15	Elevated	Finished Water Distribution	Steel	32	29	2013	2013	1951

System	Title	Capacity (MG)	Tank Style	Use	Material	Diameter	Height	Last Ext Painting	Last Int. Painting	Year Erected
St. Louis County	Oakville #2	1.5	Ground Storage	Finished Water Distribution	Steel	72	50	2018	2018	1967
St. Louis County	Old Halls Ferry	8	Ground Storage	Finished Water Distribution	Steel	175	44	2012	2012	1971
Ozark Mountain #1	Ozark Mountain #1	0.03	Standpipe	Finished Water Distribution	Steel	12	36			
Ozark Mountain #2	Ozark Mountain #2	0.058	Standpipe	Finished Water Distribution	Steel	10	100			2003
Ozark Mountain #3	Ozark Mountain #3	0.038	Standpipe	Finished Water Distribution	Steel	18	101			2003
St. Louis County	Paradise Valley	0.152	Standpipe	Finished Water Distribution	Steel	20	65	2016	2016	1979
Parkville	Park College	1	Ground Storage	Finished Water Distribution	Steel	68	37.6	2000	2000	1999
Pevely Farms	Pevely Farms Clearwell East		Ground Storage	Finished Water Clearwell	Steel					2020
Pevely Farms	Pevely Farms Clearwell West		Ground Storage	Finished Water Clearwell	Steel					2020
Joplin	Plant Washwater	0.36	Ground Storage	Wash Water	Steel	26	80	2008	1983	
Jefferson City	Plant Washwater Standpipe	0.3	Standpipe	Wash Water	Steel	20	125	2006	2006	
Parkville	Platte Woods (elevated)	0.31	Elevated	Finished Water Distribution	Steel		100	2010	2010	1957
Rogue Creek	Pressure Tank	0.008	Hydropneumatic	Finished Water Distribution	Steel		8	2019	2019	2019
Rankin Acres	Rankin Acres	0.018	Hydropneumatic	Finished Water Distribution	Steel	8	48	2020	2020	2020
Redfield	Redfield		Standpipe	Finished Water Distribution	Steel	8	110	2016	2016	
Joplin	Rex (elevated)	0.5	Elevated	Finished Water Distribution	Steel	50	125	2011	2000	1955
Parkville	Riverside (elevated)	0.5	Single Ped	Finished Water Distribution	Steel		82.5	2018	2018	1987
Riverside Estates	Riverside Estates	0.01	Ground Storage	Finished Water Distribution	Steel		27			
Jefferson City	Rockhill 179th Street Tank	1.5	Hydropillar	Finished Water Distribution	Steel/Concrete		159	2014	2014	2014
St. Louis County	Rockwood (elevated)	0.05	Elevated	Finished Water Distribution	Steel	20	120	2018	2018	1967
St. Joseph	S. 22nd St	0.5	Elevated	Finished Water Distribution	Steel		103	1987	1987	1965
Saddlebrook	Saddlebrook	0.25	Single Ped	Finished Water Distribution	Steel		80			2003
St. Louis County	Sappington #1 (dome)	2.46	Ground Storage	Finished Water Distribution	Steel	92	49	2014	1998	1954
St. Louis County	Sappington #2 (dome)	2.46	Ground Storage	Finished Water Distribution	Steel	92	49	2015	1992	1968
Tri-State	Skyline (Well 4 Standpipe)	0.3	Standpipe	Finished Water Distribution	steel	30	88	2015	2015	1987
Spokane	Spokane Well Tank	0.01	Ground Storage	Finished Water Distribution	Steel	12	18			
Stonebridge	Stonebridge (elevated)	0.4	Single Ped	Finished Water Distribution	Steel	40	69	2012		1994
Stonebridge	Stonebridge (Ground)	0.25	Ground Storage	Finished Water Distribution	Steel	22	44	2018		2003
Pevely Farms	Stonewall Tank #1	0.2	Ground Storage	Finished Water Distribution	Steel					
Pevely Farms	Stonewall Tank #2		Ground Storage	Finished Water Distribution	Steel			2021	2021	2021
Rogue Creek	Storage Tank	0.008	Ground Storage	Finished Water Distribution	Steel	21.33	8	2019	2019	2019
St. Louis County	Stratmann #1	11	Ground Storage	Finished Water Distribution	Steel	240	33	2009	2009	1960
St. Louis County	Stratmann #2	11.26	Ground Storage	Finished Water Distribution	Steel	264	27	1996	1998	1965
St. Louis County	Sunset (elevated)(dome)	0.25	Elevated	Finished Water Distribution	Steel	40	122		2020	1936
St. Louis County	Tesson Ferry #1	3	Ground Storage	Finished Water Distribution	Steel	125	33	2017	2017	1967
St. Louis County	Tesson Ferry #2 (dome)	3	Ground Storage	Finished Water Distribution	Steel	125	33	2019	2019	1996
St. Charles	Towers Rd	2	Ground Storage	Finished Water Distribution	Steel	62	90	2008	2008	1981
Tri-State	Well 6 Standpipe	0.5	Standpipe	Finished Water Distribution	Steel	27	118	2020	2020	2019
St. Joseph	Union Rd	0.04	Standpipe	Finished Water Distribution	Steel	8	110	2012	2012	
St. Louis County	Valley Park	0.75	Ground Storage	Finished Water Distribution	Steel	52	50	2006	2006	1981
Tri-State	Vineyard (Well 5 Standpipe)	0.3	Standpipe	Finished Water Distribution	steel	29	93	2014		
St. Louis County	Walton	4	Ground Storage	Finished Water Distribution	Steel	117	50	2011	2011	1979
Wardsville	Wardsville Elevated	0.15	Elevated	Finished Water Distribution	Steel		128	2021	2021	1998
Warrensburg	Warrensburg North (elevated)	0.3	Elevated	Finished Water Distribution	Steel		123	2010	2010	
Warrensburg	Warrensburg South (elevated)	0.5	Elevated	Finished Water Distribution	Steel		125	2008	2008	
White Branch	White Branch Warsaw	0.0865	Standpipe	Finished Water Distribution	Steel	11	119			
St. Louis County	Wild Horse Creek	0.5	Ground Storage	Finished Water Distribution	Steel/Bolted	35	41	1998	1967	1967
Woodland Manor	Woodland Manor Bayfront Middle	0.02	Standpipe	Finished Water Distribution	Steel	10	18.33	2017		
Woodland Manor	Woodland Manor Bayfront North	0.02	Standpipe	Finished Water Distribution	Steel	10	18.33	2017		
Woodland Manor	Woodland Manor Bayfront South	0.02	Standpipe	Finished Water Distribution	Steel	10	18.33	2017		
St. Louis County	WW. CP #1 (elevated)	0.25	Elevated	Wash Water	Steel		58.5	2019	2019	1969
St. Louis County	WW. CP #2 (dome)	1.29	Standpipe	Wash Water	Steel	61.5	60	1998	1999	1999
St. Louis County	WW. CP #3	1.33	Ground Storage	Wash Water	Steel	90	28	2010	2010	1967
St. Louis County	WW. MP	1	Ground Storage	Wash Water	Steel	65	40	2012	1999	1971

System	Title	Capacity (MG)	Tank Style	Use	Material	Diameter	Height	Last Ext Painting	Last Int. Painting	Year Erected
St. Louis County	WW. NCP (east)(dome)	0.5	Ground Storage	Wash Water	Steel	57	35	1995	2000	1963
St. Louis County	WW. NCP (west)(dome)	0.5	Ground Storage	Wash Water	Steel	52	35	1995	1996	1996
St. Louis County	WW. SCP	1	Ground Storage	Wash Water	Steel	59	51	1998	1998	1986

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Visual Sanitary Inspection Report

Project Information
Baxter Rd Tank

Prepared For
Lisa Schneider

Prepared On
6/8/2021

Prepared By
Brad Huebner

Coating Inspection Services
PO Box 133 Eureka, MO 63025
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General Information

Tank Details

Capacity:	8,000,000 Gallon.
Construction Style:	Ground Storage.
Builder:	Nooter.
Construction Date:	1968.
Exterior Coating:	Urethane.
Interior Coating:	Epoxy.
Inspector:	Brad Huebner.
Inspection Date:	6/1/2021.
Height:	45'H / 175'Dia.

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General Information

Exterior Coatings Condition

Exterior coating condition: Coatings are in good condition with an average of 9.0-13.0 mils DFT. Top coat delamination along edges of upper knuckle and roof connection. Surface rust around weld seam of roof patch. Minor mold and mildew streaking on sidewalls.

Foundation :	Concrete, in good condition.
Overflow Pipe:	Concrete vault to rip-rap, doesn't drain away from tank sidewall.
Overflow Screen:	Not accessible.
Flap Gate:	Yes, not accessible.
Splash Pad:	Rip-Rap.
Exterior ladder:	Good condition with partial cage, smooth rungs not OSHA compliant.
Safety Climb:	Safety bar.
Ladder Gate:	Aluminum, good condition.
Vent:	(2) Aluminum frost free safety vents.
Manway:	(1) 24" round, (1) 30" round.
Catwalk:	N/A.
Cables:	One coax cable secured to ladder landing handrail and ladder standoffs.
Roof Hatch:	24" x 24" with 4" curb.
Aviation Light:	None.
Roof Ladder:	N/A.
Cellular Carriers	None.

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General Information

Interior Coating Condition

Interior Coating Condition: Overall good condition with some minimal spot rusting on walls and ceilings. Tops of roof beams corrosion due to contact with roof plates and condensation.

Interior Wet Ladder: God condition with minor rusting on top rung.

Safety Climb: None.

Interior Riser Ladder: N/A.

Cathodic Protection: None.

Dry Riser: N/A

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General Information

Security

Gates and Fences: Chain link fence with locked gate

Ladder Gate: Cyber lock.

Roof Hatch: Cyber lock.

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Exterior Coating Photos

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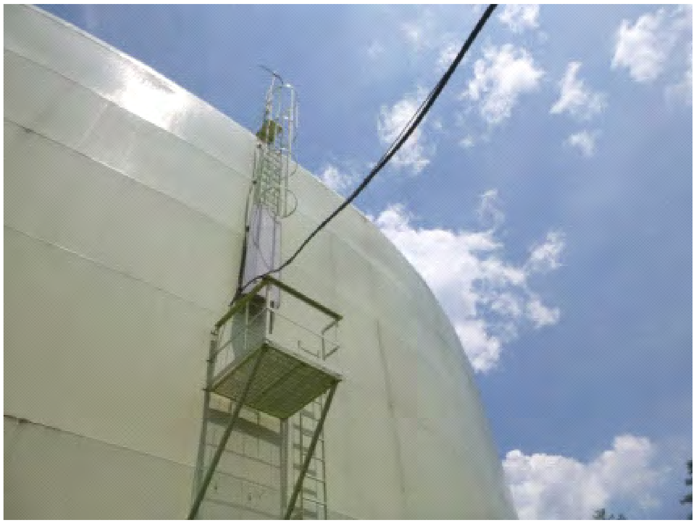

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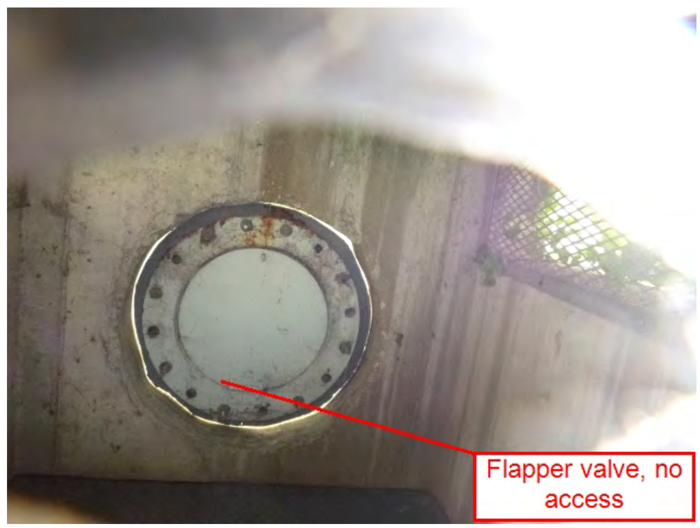

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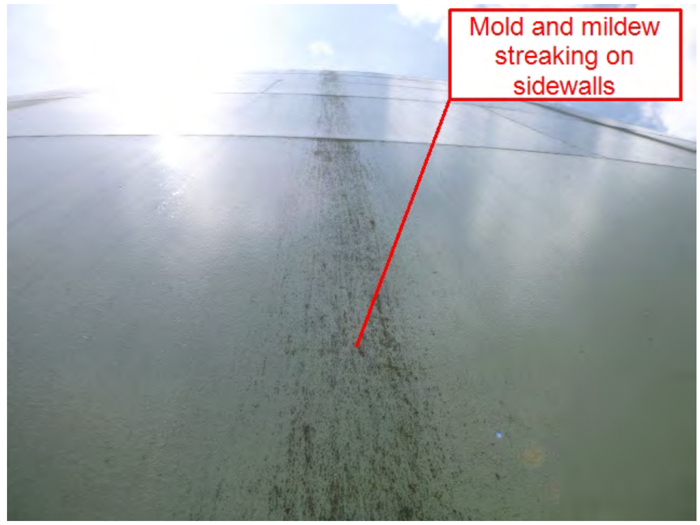

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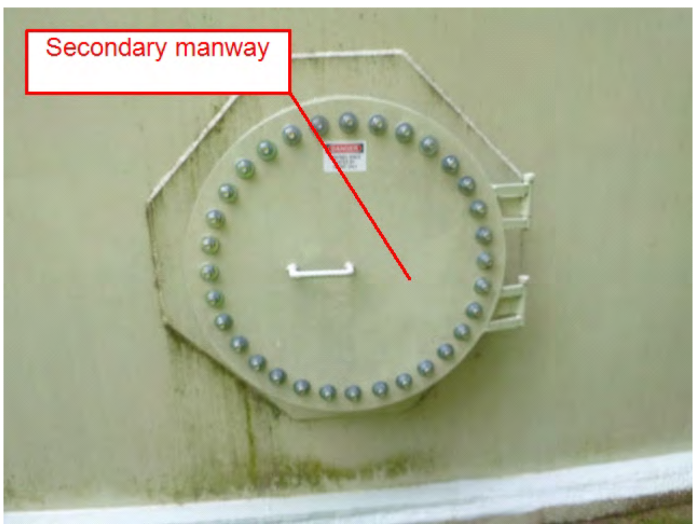

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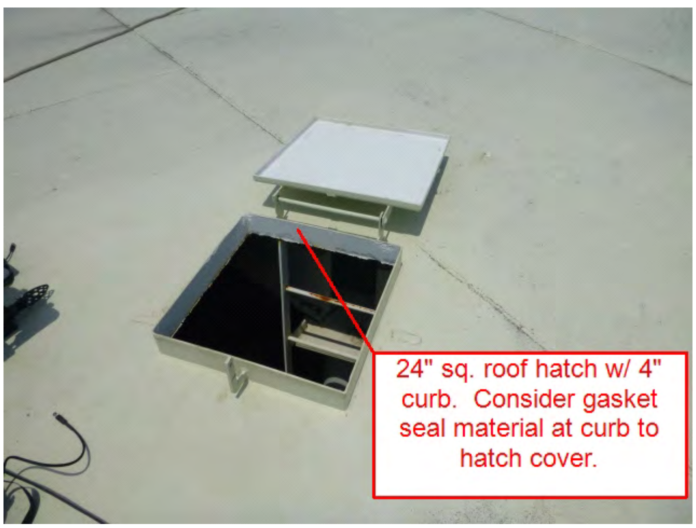

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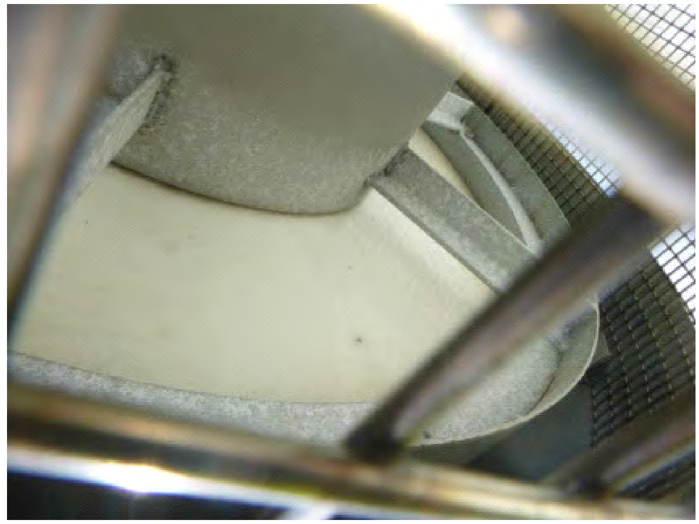

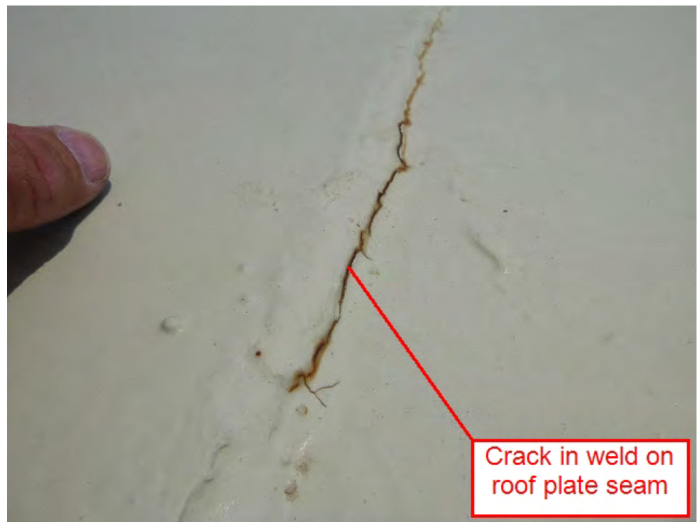

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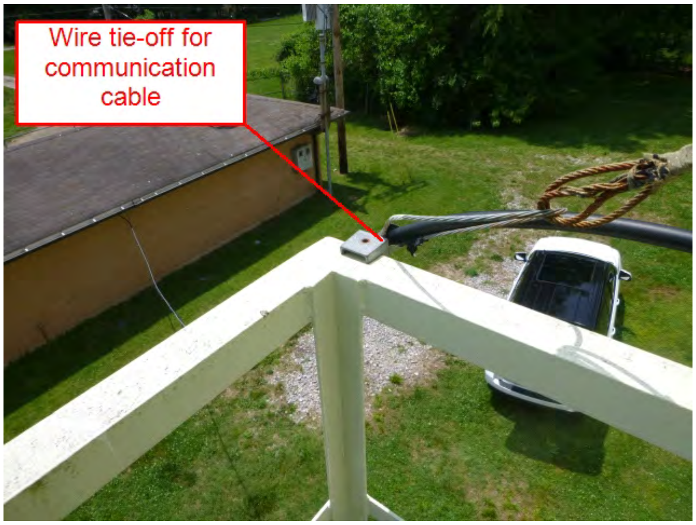

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Interior Coating Photos

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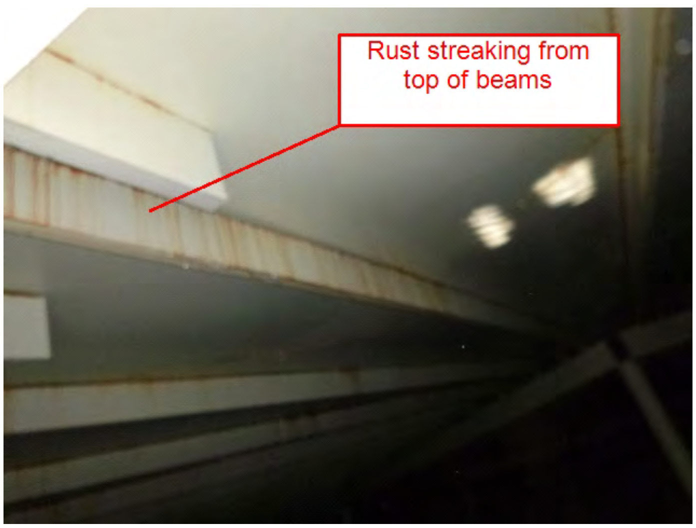

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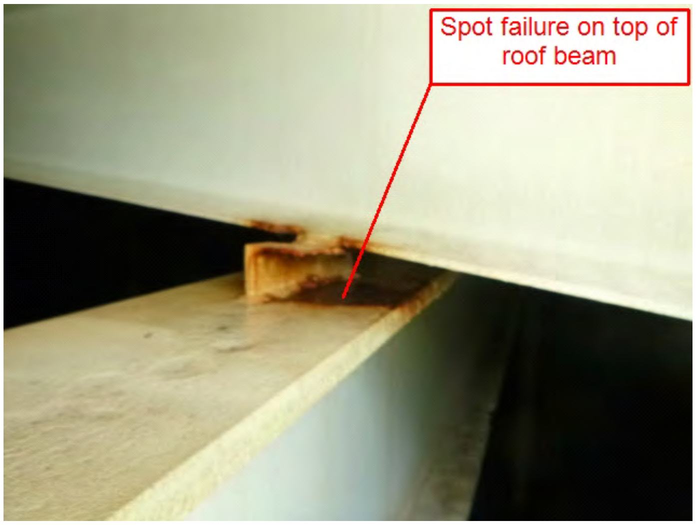

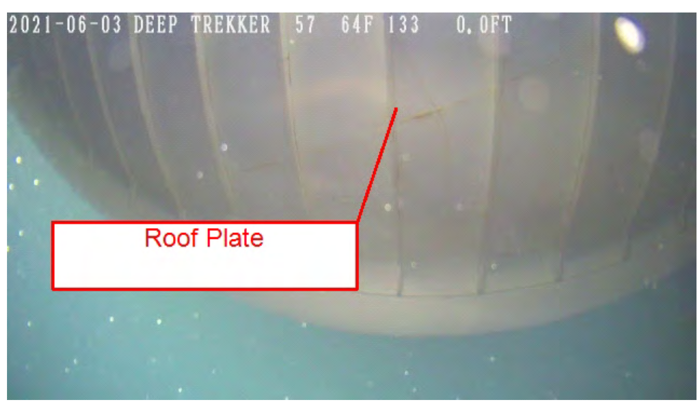

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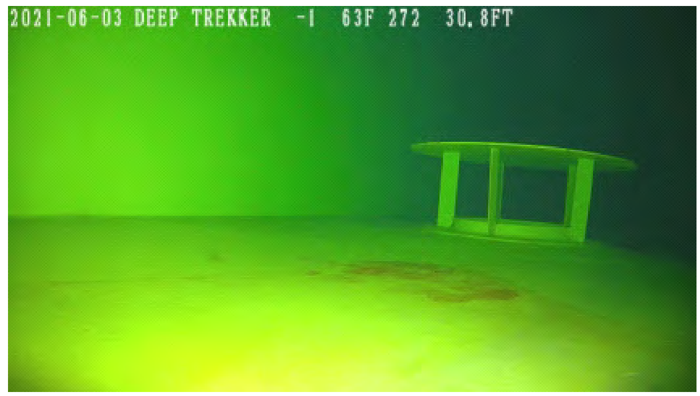

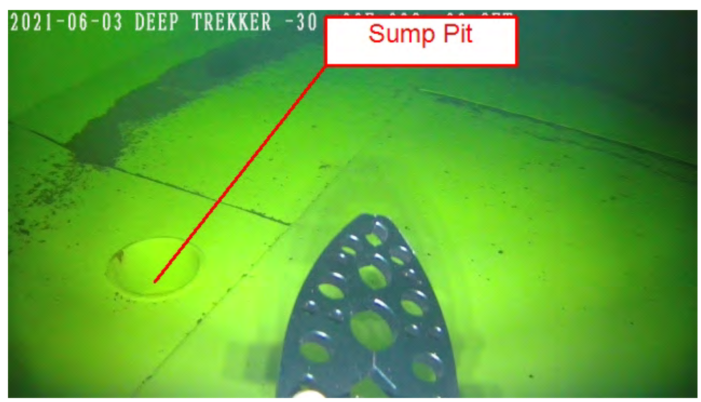

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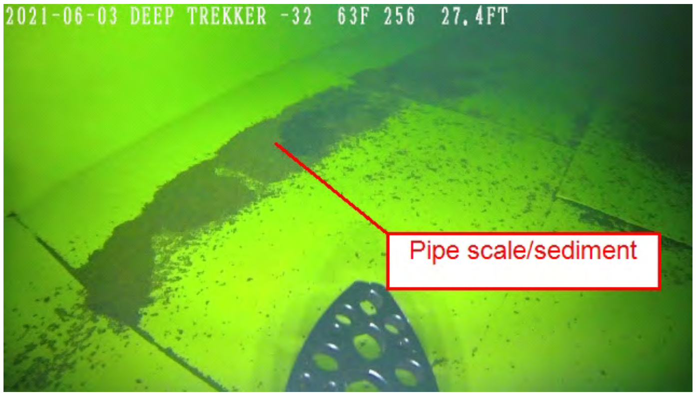

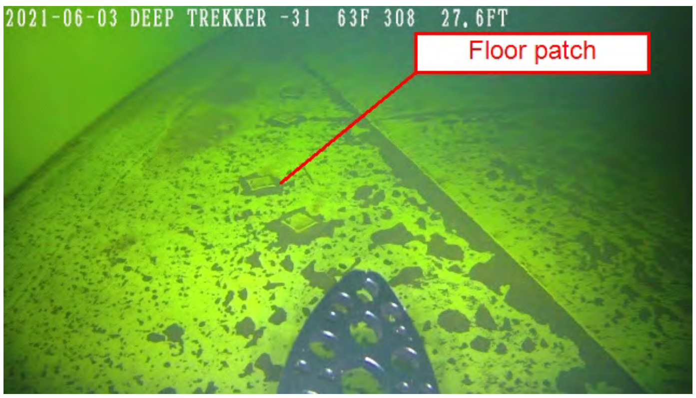

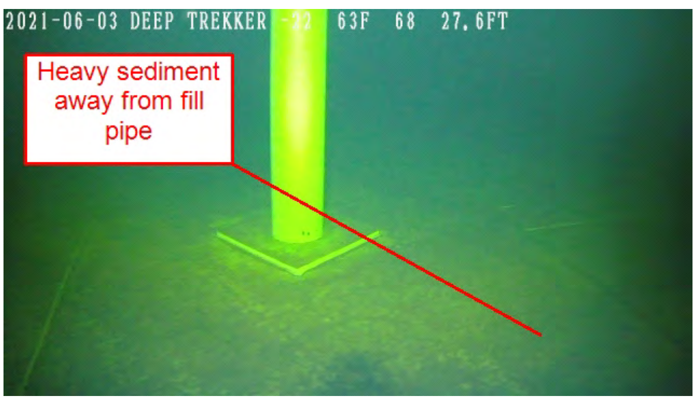

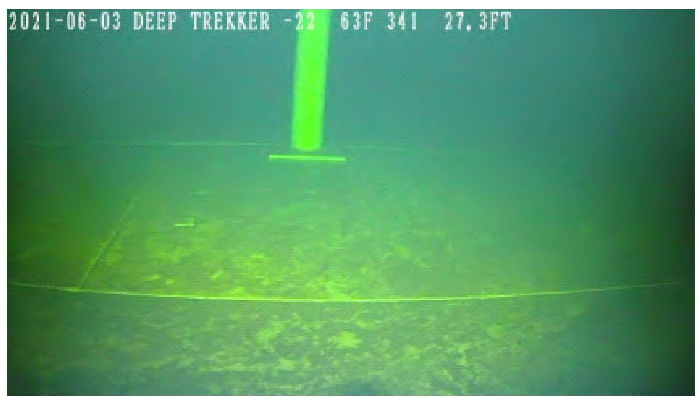

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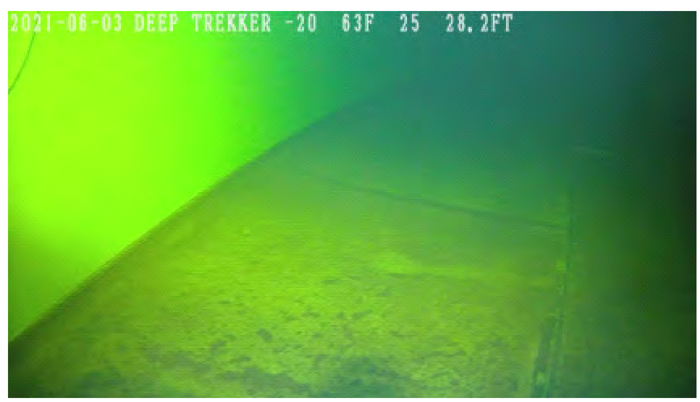

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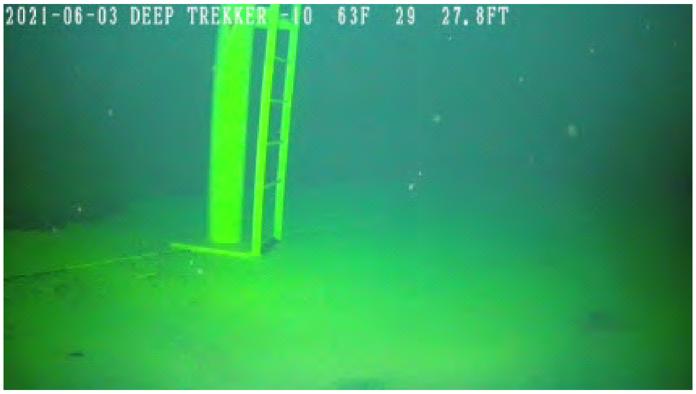

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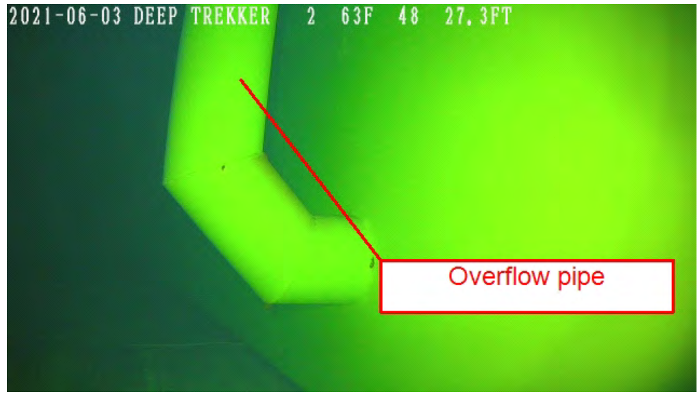

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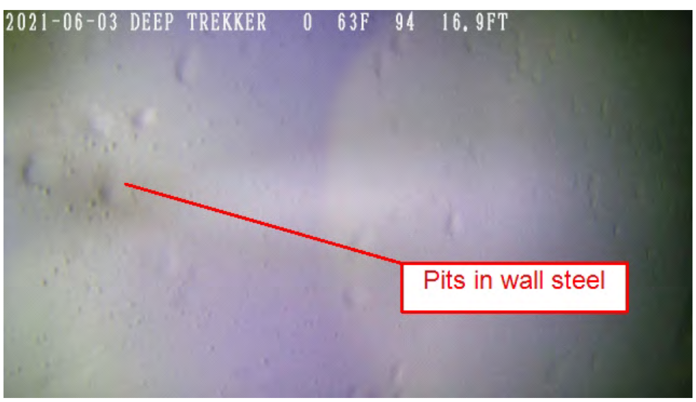

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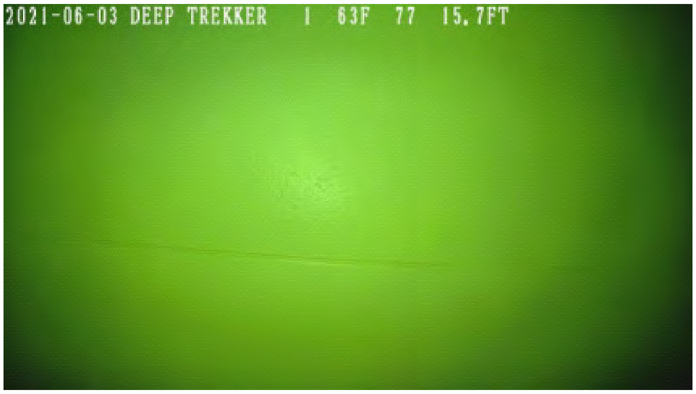

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Tank Recommendations

Recommendations

- Remove brush and weed growth from around overflow vault.
- Trim grass away from ringwall and grass to be blown away from tank, not on it.
- Lower grade on north side of tank to 6" below top of foundation.
- Repair cracked weld on roof.
- Coat rusted weld seam on roof to prevent wall rust streaking.
- Consider installing gasket seal on roof hatch.
- Consider a washout of pipe scale and sediment on floor of tank.
- Powerwash mold on exterior of tank.

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Visual Sanitary Inspection Report

Project Information
Mexico West Tank

Prepared For
Lisa Schneider

Prepared On
8/7/2020

Prepared By
Brad Huebner

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General Information

Tank Details

Capacity:	250,000 Gallon.
Construction Style:	Elevated / Legged.
Builder:	Phoenix.
Construction Date:	1988.
Exterior Coating:	Urethane.
Interior Coating:	Epoxy.
Inspector:	Brad Huebner.
Inspection Date:	8/6/2020.
Height:	136'H.

Phone: 314-369-3087

General Information

Exterior Coatings Condition

Exterior coating condition: Coatings are in fair condition with an average of 14.0-20.0 mils DFT. Peeling paint around base of legs. Multiple spots of top coat delamination on legs, riser, bowl, and catwalk. Rusting around roof hatch curb.

Foundation :	Concrete, good condition. Lower grade to 6" below top of foundation.
Overflow Pipe:	Concrete vault.
Overflow Screen:	Not accessible.
Flap Gate:	Yes, not accessible.
Splash Pad:	Rip-Rap.
Exterior ladder:	Good condition, smooth rungs not OSHA compliant.
Safety Climb:	Safety bar.
Ladder Gate:	Aluminum.
Vent:	Aluminum frost free, insect screen intact.
Manway:	(1) 24" round.
Catwalk:	Good condition.
Cables:	Two coax cables attached to ladder standoffs.
Roof Hatch:	24" x 24" with 6" curb.
Aviation Light:	None.
Roof Ladder:	Good condition with safety bar. Ladder has smooth rungs.
Cellular Carriers	None.

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General Information

Interior Coating Condition

Interior Coating Condition: Coatings are in good condition with an average of 13.5 mils DFT. Isolated spots of rusting along roof weld seams and around overflow box. Three spot failures visible on sidewalls with minimal sediment on bowl floor.

Interior Wet Ladder: Good condition.

Safety Climb: None.

Interior Riser Ladder: N/A.

Cathodic Protection: None.

Dry Riser: N/A

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Security

Gates and Fences: Chain link fence with locked gate.

Ladder Gate: Locked.

Roof Hatch: Locked.

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Exterior Coating Photos

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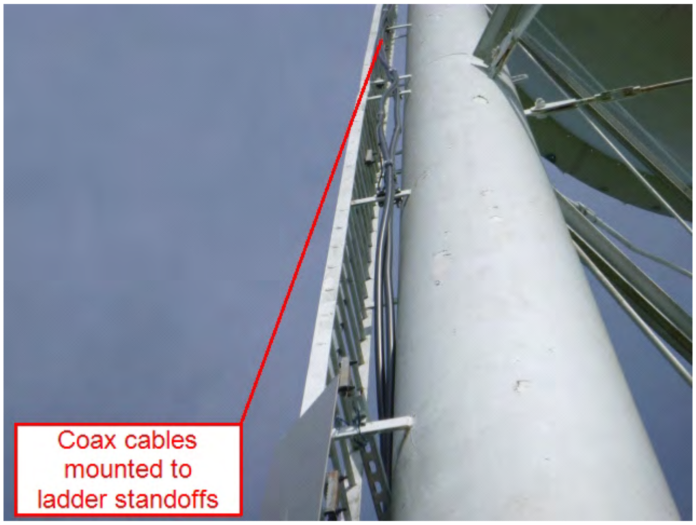

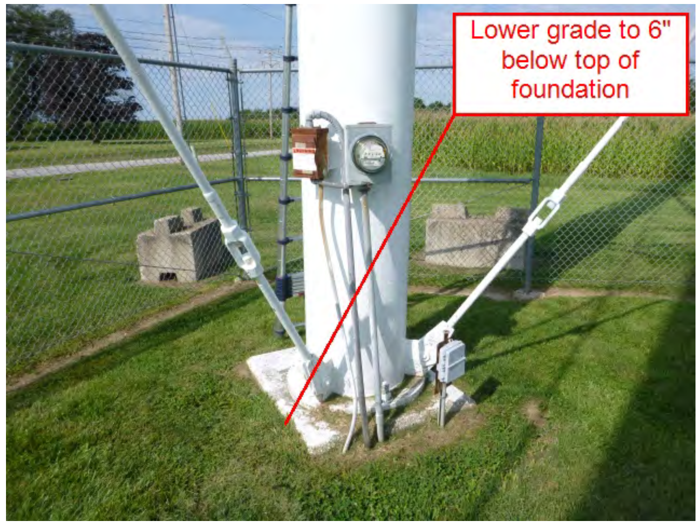

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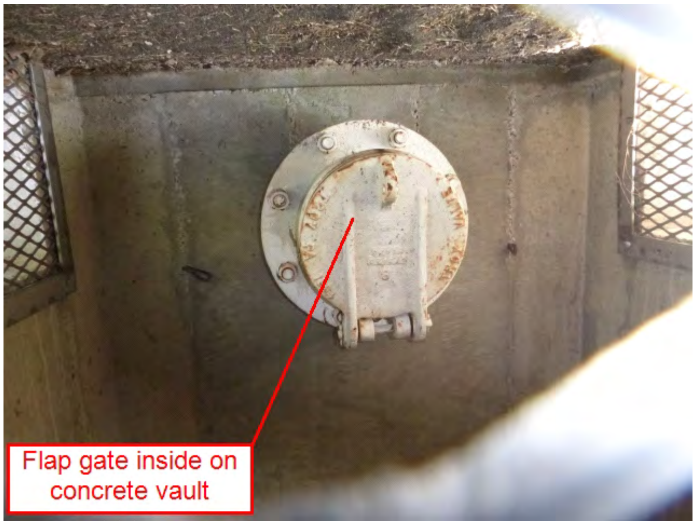

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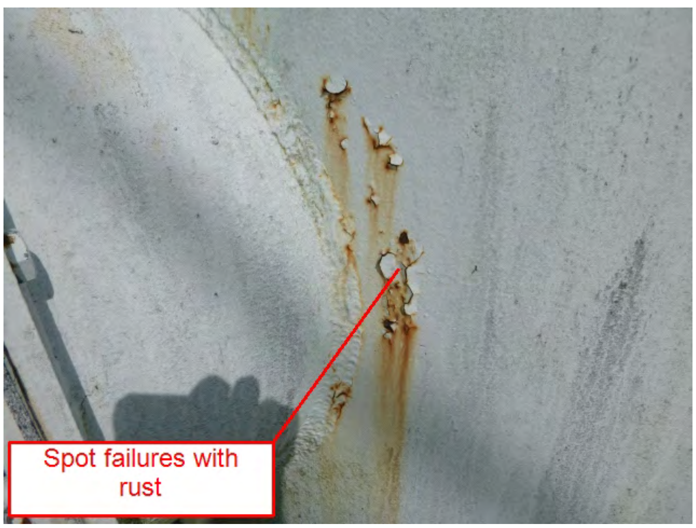

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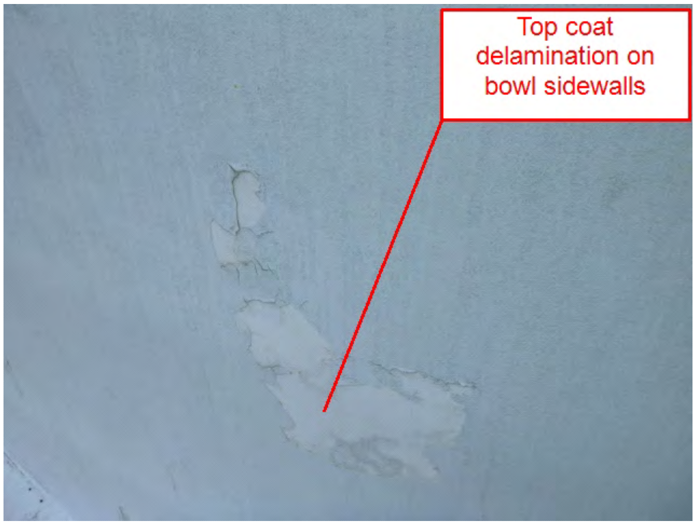

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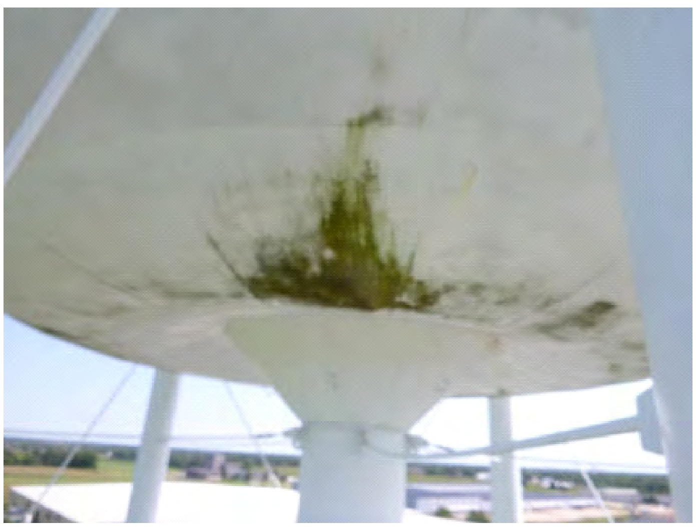

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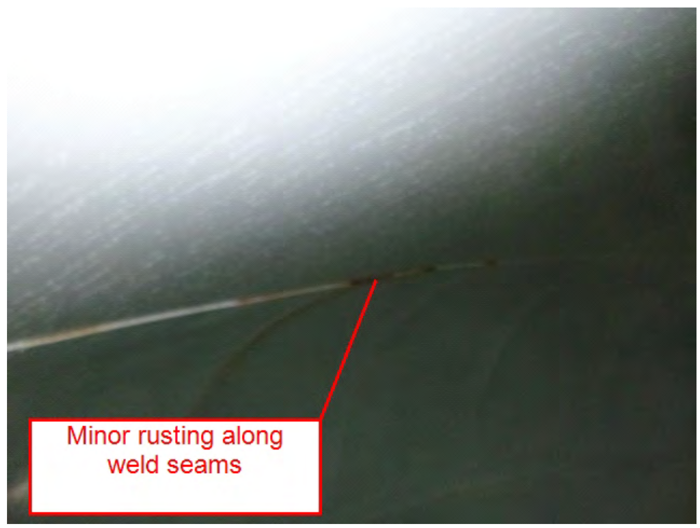
Interior Coating Photos



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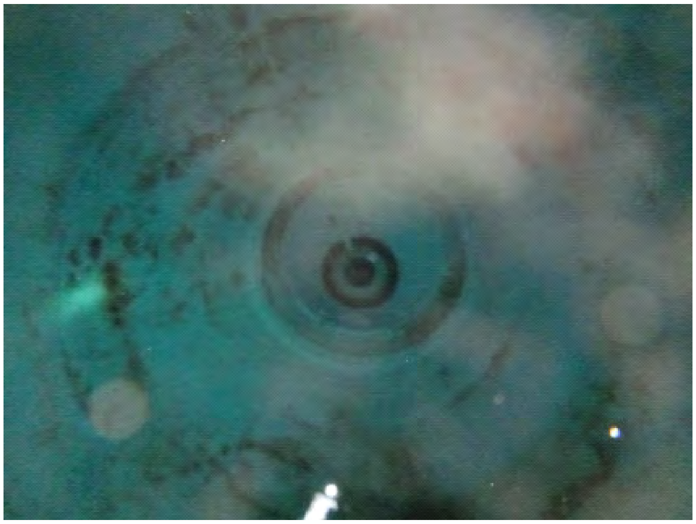
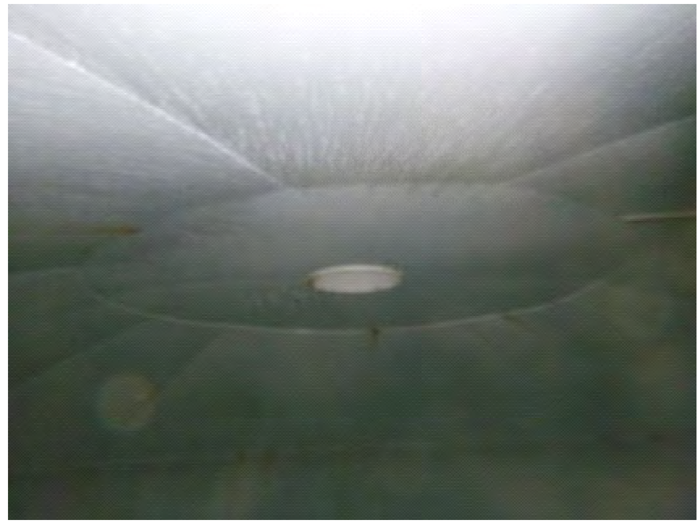

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Rust streaking
on bowl
sidewalls

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Tank Recommendations

Recommendations

- Relocate coax cables from ladder standoffs.
- Lower grade to 6" below top of foundation.
- Pressure wash tank to remove mold and mildew growth.
- Plug old electrical junction box on roof.

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