Potable Water Tank Management and Risk Mitigation for a Federal Healthcare Facility

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Abstract

A federal healthcare facility depends on a reliable potable water system to support patient care, sanitation, and daily operations. This project developed a structured engineering management approach for inspecting, monitoring, and maintaining a potable water tank. The methodology integrated laboratory testing, structural inspection, risk evaluation, maintenance verification, and operational planning to improve regulatory compliance and system reliability. Results demonstrated that organized inspection workflows and preventive maintenance activities can reduce operational risks and improve long-term maintenance planning.

Key Terms — Engineering Management, Potable Water Tank, Risk Mitigation, Water Quality Monitoring

Introduction

A potable water storage tank is a critical infrastructure component in a federal healthcare facility because it supports patient care, sanitation, emergency response, and daily operations. Conditions such as corrosion, sediment accumulation, coating deterioration, and biological growth can affect water quality and system performance if not properly managed.

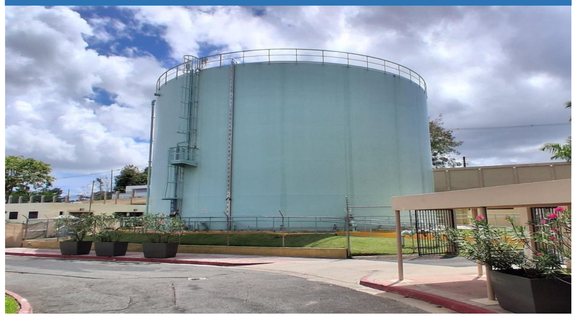
This project developed a structured engineering management approach for the inspection, monitoring, and maintenance of a potable water tank. The methodology integrated laboratory testing, structural inspection, maintenance verification, risk evaluation, and documentation practices to support regulatory compliance, preventive maintenance planning, and long-term operation of the potable water system.

The objective of this project was to develop a structured engineering management approach for the inspection, monitoring, and maintenance of a potable water tank at a federal healthcare facility.

Literature Review

Potable water tank management requires regulatory compliance, water-quality monitoring, corrosion control, and preventive maintenance to ensure reliable operation [1]–[4].

1M Gallon Potable Water Tank



Methodology

A structured engineering management approach was used to inspect, evaluate, and maintain a potable water tank. The methodology integrated laboratory testing, structural inspection, risk evaluation, maintenance verification, and documentation practices to support operational reliability and compliance.

	Task Name	Duration	Apr 13 '26	Apr 20 '26	Apr 27 '26	May 4 '26	May 11 '26	May 18 '26	May 25 '26	Jun 8 '26
1	Pre-Sampling	1 day	Laboratory							
2	Water Consumption	4 days		Facilities						
3	Project Assessment	2 days			QC/EHS Manager					
4	Structural Inspection	2 days				Structural Engineer				
5	Cathodic Inspection	2 days					Electrical Engineer			
6	Cleaning/Disinfection	10 days						Subcontractor		
7	Refill Water Tank	4 days							Facilities	
8	Water Sampling	1 day								Laboratory
9	Sample Report	5 days								QC/EHS Manager
10	Work Acceptance	2 days								PM Hospital

Figure 1 illustrates the preventive maintenance schedule developed to support inspection planning and long-term potable water tank reliability.

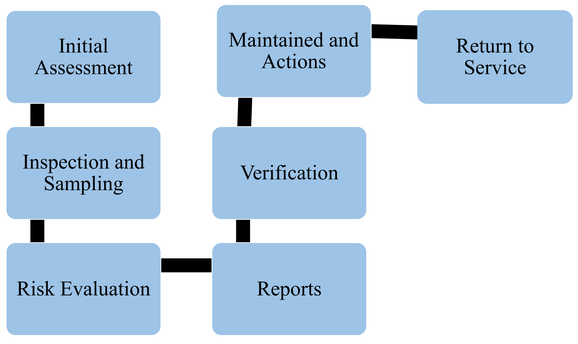


Figure 2 summarizes the annual frequency of maintenance activities performed to evaluate tank conditions and water quality.

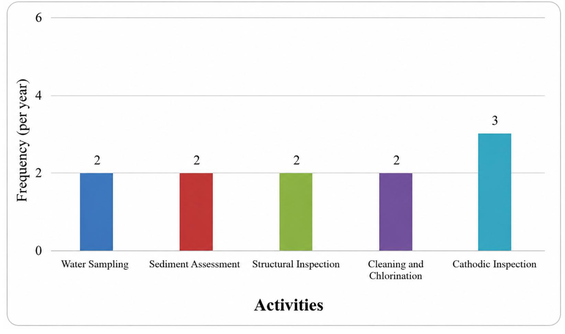


Figure 3 shows the frequency of preventive maintenance activities associated with water tank operations.

Results

The project demonstrated that a structured inspection and maintenance approach improve operational reliability, compliance, and risk reduction for a potable water tank at a federal healthcare facility.

INTEGRATED MANAGEMENT FRAMEWORK

FRAMEWORK COMPONENT	PURPOSE	VERIFICATION / OUTPUT
Water Quality Evaluation	Confirm potable water compliance before and after maintenance activities	Laboratory results for turbidity, coliform, E. coli, chlorine, and pH
Structural and Corrosion Assessment	Identify tank integrity concerns and corrosion-related maintenance needs	Inspection summary of tank floor, coating, roof, overflow area, welds, and cathodic protection
Maintenance Planning	Define required corrective or preventive actions based on inspection and testing results	Cleaning, disinfection, coating review, corrosion monitoring, and repair planning
Verification and Return to Service	Confirm that maintenance actions were effective and the tank was suitable for continued operation	Final laboratory testing, inspection confirmation, and return-to-service documentation
Documentation Control	Maintain traceability of inspection results, maintenance actions, and compliance records	Inspection checklists, testing records, cost records, schedule records, and work-hour documentation
Resource and Schedule Control	Coordinate personnel, subcontractors, work hours, and project costs	Cost, duration, and labor-hour performance comparison

WATER QUALITY RESULTS

PARAMETER	INITIAL SAMPLING	FINAL SAMPLING	STATUS
TURBIDITY (NTU)	<1.00 NTU	<0.35 NTU	ACCEPTABLE
COLIFORM (Presence/Absence)	ABSENT	ABSENT	COMPLIANT
E. COLI (Presence/Absence)	ABSENT	ABSENT	COMPLIANT
CHLORINE RESIDUAL (mg/L)	0.98 mg/L	1.15 mg/L	ACCEPTABLE
pH (pH Units)	7.92	8.01	ACCEPTABLE

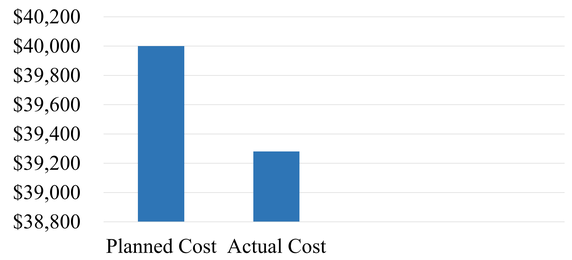
STRUCTURAL CONDITION SUMMARY

COMPONENT	INSPECTION FINDING	STATUS
Tank Floor	Areas requiring continued monitoring were identified	Moderate
Protective Coating	Maintenance attention was required in selected areas	Moderate
Roof Structure	No critical structural deficiencies were reported, but continued monitoring was required	Moderate
Overflow Area	Inspection confirmed the need for continued preventive monitoring	Moderate
Welds	Weld conditions were observed to remain acceptable	Acceptable
Cathodic Protection	System was operational and supported corrosion control	Acceptable

Acceptable — No action required | Moderate Condition — Monitor and plan maintenance | Maintenance Needed — Action recommended

PROJECT PERFORMANCE SUMMARY

CATEGORY	PLANNED	ACTUAL	STATUS
Cost	$40,000	$39,280	Within Budget
Duration	4 Weeks	4 Weeks	On Schedule
Work Hours	224 Hours	219.98 Hours	Within Planned Hours



Future Work

INITIATIVE	STATUS
Expanded corrosion monitoring	Planned
Predictive maintenance planning	Planned
Digital inspection tracking integration	Planned
Lifecycle cost evaluation	Planned
Integration with facility asset management systems	Planned

Conclusions

The project demonstrated that a structured inspection and maintenance framework can support safer operations and a more dependable potable water distribution system. It also highlights the importance of organized documentation to support traceable maintenance decisions and safer, more reliable water system operations.

References

[1] Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 7th ed., PMI, 2021.

[2] U.S. Environmental Protection Agency (EPA), National Primary Drinking Water Regulations, Washington, DC.

[3] American Water Works Association (AWWA), ANSI/AWWA C652 – Disinfection of Water-Storage Facilities.

[4] American Water Works Association (AWWA), M42: Steel Water-Storage Tanks, Manual of Water Supply Practices, Denver, CO.