



# Memorandum

## MONTEREY REGIONAL WASTE MANAGEMENT DISTRICT

Reviewed by: [Signature] Date: 8/13/21  
General Manager

DATE: August 13, 2021  
TO: General Manager  
FROM: Senior Engineer  
SUBJECT: MRF Fire Sprinkler System Piping Protection

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**RECOMMENDATION:** That the Board authorize the General Manager to execute a contract with Western States Fire Protection Company of Roseville, CA for Materials Recovery Facility (MRF) Fire Sprinkler System Piping Protection System in the amount of \$42,280.

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### BACKGROUND

The Material Recovery Facility (MRF) has been the center of the Monterey Regional Waste Management District's (MRWMD) recycling efforts since its construction in 1996. The 100,000 square foot building houses MRWMD's sorting equipment as well as recyclable materials. Increasingly over the past few years the building's main overhead fire suppression sprinkler system has required increasingly frequent repairs of pin hole leaks. These types of leaks indicate the presence of corrosion within the fire sprinkler system water piping. These leaks are the result of trapped oxygen rich ambient air in the sprinkler lines which accelerate the water's ability to corrode the metal pipes from the inside out. Since the installation of the new sorting equipment in 2017, these leaks have occurred in areas that are difficult to access and require the erection of scaffolding; a time consuming and relatively costly endeavor.

MRWMD staff pursued a quote for full replacement of the existing sprinkler system and was quoted around \$450,000. Given the cost, the amount of sprinkler to be replaced, and the complexity of installing piping above the existing equipment while in operation, MRWMD staff pursued an alternative to full piping replacement.

The alternative selected and presented in this report is one which purges the air trapped in the sprinkler piping and replaces it with a nitrogen gas to minimize the potential for corrosion in the sprinkler piping system. Thus, mitigating the development of leaks and prolonging the life of the existing system. The nitrogen gas is an inert gas and inerting the system can drastically reduce corrosion and prolong the life of the piping system by an additional 5 - 10 years depending on the initial condition of the piping.

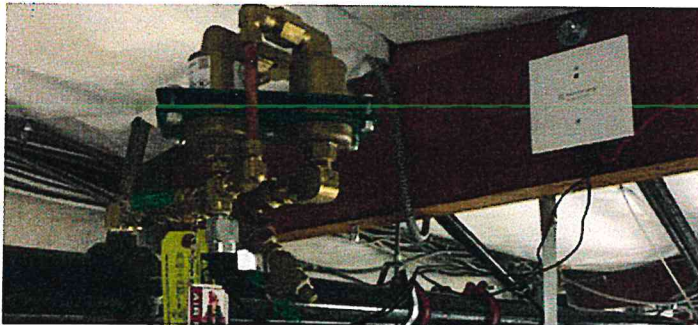
For this project, MRWMD contacted three fire protection contractors with the adequate resources to complete the job. Of the three, Western State Fire Protection was the only firm to visit the site and provide a recommendation and quote for this work.

**DISCUSSION**

Oxygen corrosion is the primary and predominant source of metal loss in wet pipe fire sprinkler systems. The most common location for this corrosion, and resultant leaks, is at the high points of the wet pipe system where trapped air can accumulate. Pockets of trapped air act as reservoirs of corrosive oxygen, which will continue to dissolve into adjacent water and promote the corrosion reaction process until all the oxygen is consumed.



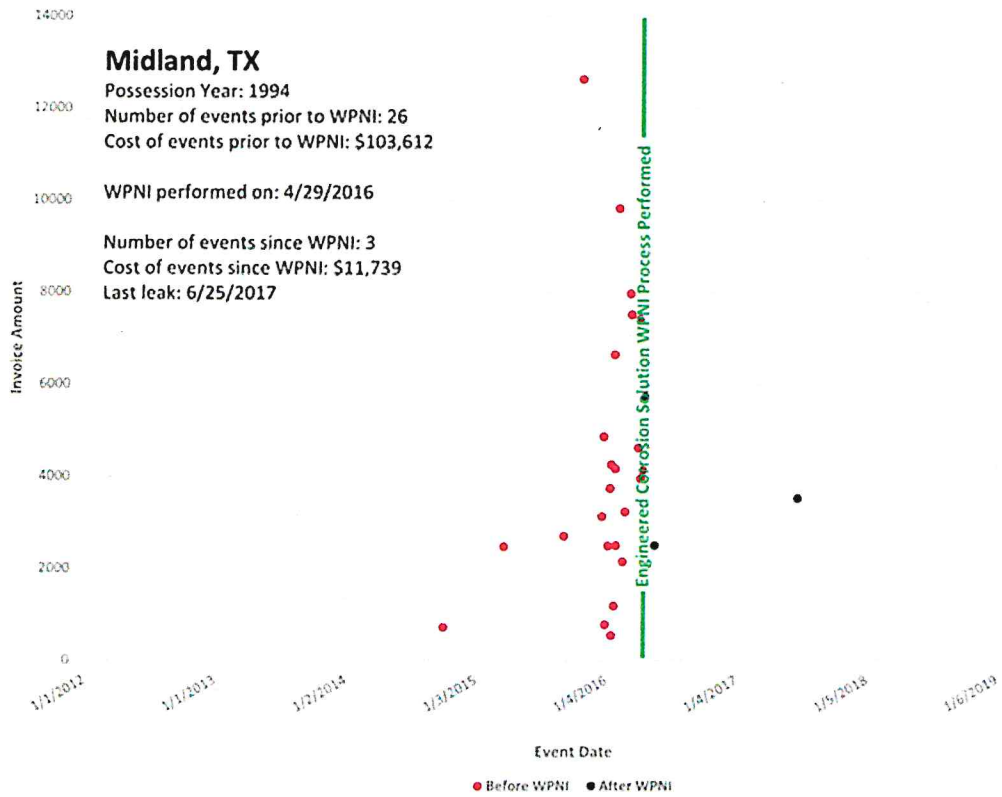
The best method for keeping oxygen out of sprinkler system piping is to vent the system by installing a Protector Nitrogen Inerting Vent (PAV-WN) on each fire system riser. This reduces the amount of oxygen available to react with the pipe wall by inerting the system with nitrogen to 98%. Below is a good picture of an oxygen rich system compared to an oxygen free system. Black water indicates corrosion and loss of pipe wall thickness, weakening the pipe and making it susceptible to leaks.



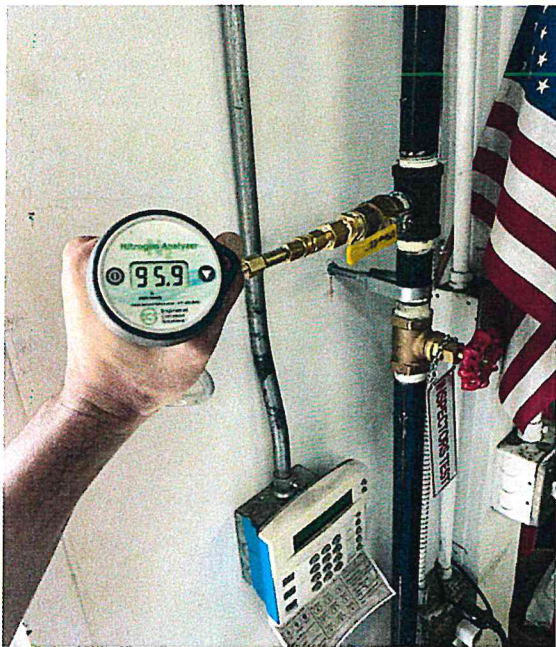
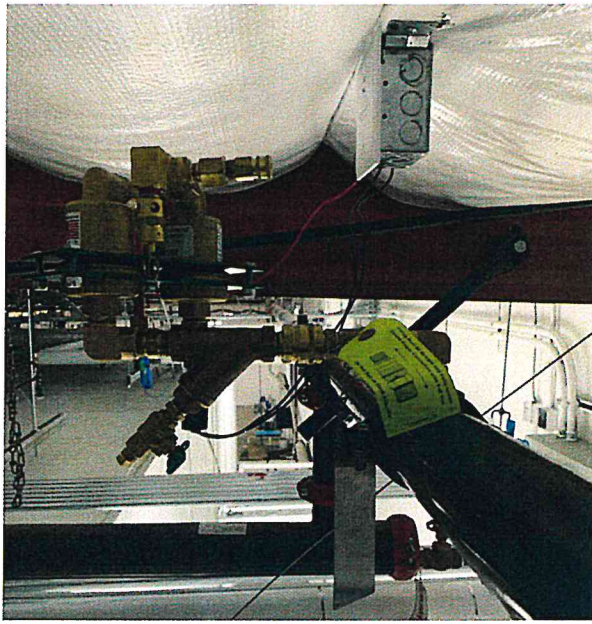
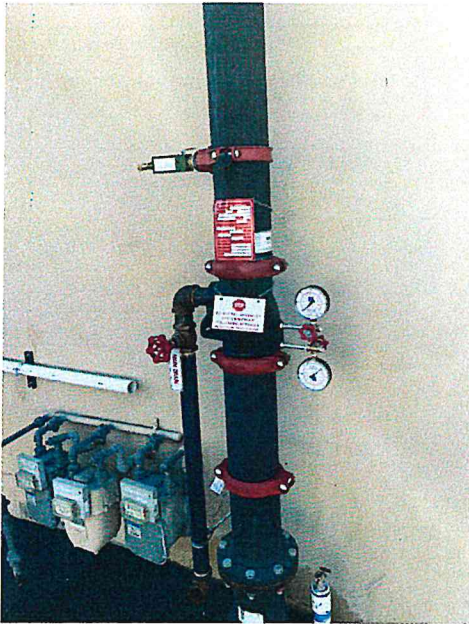
Oxygen Rich System

Oxygen Free System

Inerting with nitrogen in similar fire sprinkler systems has shown positive results in prolonging the useful life of the piping. Big box warehouse facilities have been analyzed before and after nitrogen inertion to evaluate the effectiveness of this approach. The results of one case study, that is considered to be typical of most cases, is presented in the chart below. The red dot's indicate piping leaks before the nitrogen system was installed, the green line is the point when the nitrogen system started operating, and the black dot's represent the leak repairs that occurred later,. The pipe repairs all but stopped. This was a 20 plus year old system similar to the one at MRWMD MRF.



The proposed Wet Pipe Nitrogen Inerting system project will include installation of automatic air vents, nitrogen injection ports, inspector test locations to enable hand held gas analyzers to be used, and inerting gas.



Once the nitrogen purge system has all the components installed, the sprinkler system piping will be filled with water until all low points and vents have bled all the air off, then the nitrogen bottles are connected to the injection port and turned on to start the inerting process. The system goes through a series of 'burp' sequences to displace any remaining air until the hand held analyzer reads 98% nitrogen at the test stations. Then the sprinkler system is closed up, the nitrogen bottles are disconnected, and the sprinkler system is returned to normal service. Airgas (or similar nitrogen supply vendor) comes and picks up the nitrogen bottles. No nitrogen bottles are keep onsite after initial filling. The inerting sequence is repeated whenever there is a damaged sprinkler head or broken pipe that sets the sprinkler alarm system off (about \$1,300 per occurrence).

Normal inspections of the sprinklers will not require the system inerting. MRF Fire Sprinkler System Piping Protection  
August 13, 2021  
Page 5

### **FINANCIAL IMPACT**

This work was included in the FY 2021/22 budget of the Facilities Maintenance section for the Material Recovery Facility (MRF). It is anticipated that these piping protection measures will reduce the frequency and cost of sprinkler system repairs in the MRF and will defer the replacement of the MRF sprinkler piping for more than five years.

### **CONCLUSION**

The MRF Fire Sprinkler System Piping Protection project will help prolong the life of the MRF fire sprinkler piping in areas that are difficult to reach and reduce the frequency of pinhole leaks that have occurred with increasing regularity. Staff therefore recommends that the Board authorize the General Manager to execute a contract with Western States Fire Protection Company of Roseville, CA for Materials Recovery Facility (MRF) Fire Sprinkler System Piping Protection in the amount of \$42,280.



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David Ramirez, P.E.