Engineered Corrosion Solutions™

Complete Corrosion Control.

DPNI

DRY PIPE NITROGEN INERTING

Project Case Study - Mission Critical Data Center

Project Type:	**Enterprise Data Center**
Location:	**Saint Louis, Missouri**
Sprinkler Systems:	**Five Double Interlock Pre-action Systems**
Nitrogen Introduced:	**July 2011**

History and Background

The 100,000 sq. ft. data center opened in 2002 with pre -action fire sprinkler systems used to protect all critical areas. After 8 years in service leaks began to develop in the 3-inch galvanized schedule 10 main piping within the facility. Multiple leaks per year were reports and all occurred within the supply main piping under accumulations of residual trapped water. Because of the age of the system, piping was not required to be pitched when installed so the system was filled with a significant volume of trapped water. The metal loss was characterized by highly localized attack with many deep pits beneath the trapped pools of water. The average corrosion pit depth from the pipe samples extracted from the facility was 45% wall penetration.

Galvanized Pipe Corrosion under Trapped Water

ECS Scope of Work

ECS was contracted to provide a corrosion assessment survey in July 2010 to determine the extent of damage within the existing fire sprinkler piping.

In 2011 the owner installed an ECS Protector Nitrogen Generation System that utilized patented “fill and purge” breathing technology to remove oxygen from the fire sprinkler piping and provide nitrogen gas for pressure maintenance. ECS has been retained to perform annual inspections of corrosion management equipment.

Nitrogen Generator installed in Riser Room

Performance

No fire sprinkler system piping was replaced within the facility prior to the installation of the ECS Protector Nitrogen Generation System. ECS informed the owner that under a nitrogen atmosphere the corrosion in the fire sprinkler system piping would be stopped, even in locations with trapped pools of water. An on-line gas analyzer was also installed and connected to the building management system to monitor performance of the nitrogen system. Since the nitrogen generator was installed and commissioned, there have been no recorded leaks within the pre-action fire sprinkler systems at the facility.

Engineered Corrosion Solutions

Complete Corrosion Control.

WPNI

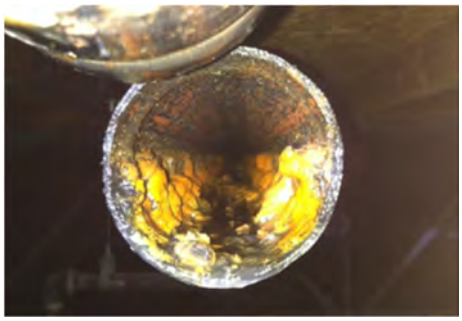
WET PIPE NITROGEN INERTING

Project Case Study - Mission Critical Manufacturing Facility

Project Type:	**Large Aerospace Equipment Manufacturing Warehouse**
Location:	**Los Angeles, California**
Sprinkler Systems:	**25 Wet Pipe Systems**
Nitrogen Introduced:	**October 2010**

History and Background

The one million sq. ft. building was built in the 1960's and protected by twenty-five overhead wet pipe sprinkler systems that had been renovated many times to accommodate changes to building operations. The building had a long history of leak repairs (one leak every 2 weeks) and some systems were completely replaced once leak frequency became untenable. The wet pipe systems were characterized by many elevation changes to accommodate protection of high bays, below finished ceiling office areas, and mezzanine areas. There was a tremendous amount of trapped air in each system. The majority of the damaged piping was found at the air/water interface adjacent to trapped pockets of air within the piping. Much of the fire sprinkler supply mains contained large amounts of corrosion by-product (iron oxide) solids from the black steel piping.



Corrosion at Air/Water Interface

ECS Scope of Work

ECS was contracted to provide a corrosion assessment survey in August 2010 to determine the root cause of corrosion and the extent of damage within the existing fire sprinkler piping.

Later that year the owner installed ECS Protector Nitrogen Inerting Vents and injection ports on each system to remove oxygen from the fire sprinkler piping. A portable nitrogen generator was used to supply nitrogen gas at the external riser of each fire sprinkler system. ECS has since provided assessment services and corrosion management equipment for several other buildings on the same campus.

Portable Nitrogen Generator for Facility

Performance

All fire sprinkler system mains were flushed but no piping was replaced prior to completion of Wet Pipe Nitrogen Inerting. When service is performed on the systems the owner has reported that water drained from the sprinkler system is completely clear with no sign of corrosion by-product. Since the facility was treated with nitrogen there has been one reported leak within the fire sprinkler systems. Upon investigation it was determined that when replacing a flow switch the maintenance personnel did not follow the protocol to maintain a nitrogen atmosphere and allowed oxygen to enter the system and re-start the corrosion process - resulting in the leak. The system was returned to a nitrogen atmosphere and no additional leaks have been reported.