Viking Tunnel Deluge System | **Case Study**

Port of Miami Tunnel Project:

By connecting SRA1A/ MacArthur Causeway to Dodge Island, this project will provide direct access between the seaport and highways I-395 and I-95, and create another entry to the Port of Miami. The tunnels will improve traffic flow and aid in ongoing and future development in and around downtown Miami.

Groundbreaking began in 2010, and the tunnels are expected to be open for traffic in June of 2014.

Viking Designs Custom Deluge Cabinets for Port of Miami Tunnel Project

The Challenge: Create a deluge fire suppression system for twin tunnels that are each 4,200 feet long, 43 feet in diameter, and 120 feet below the Miami seaport.

Tunnel fire systems present unique problems. Space is limited, and curved tunnel walls make standard cabinet designs unworkable. Air currents can push heat away from the fire's source, potentially activating sprinklers that can't reach the fire. The fire can even be a moving target on a burning vehicle. And high gallon per minute flow requirements make valve specification and design far from routine.

"We have a great working relationship with Viking. Their ability to value-engineer this tunnel package was crucial to the success of this project."

Darryl Jewell,
Sr. Vice President,
National Fire Protection
www.natlfire.com

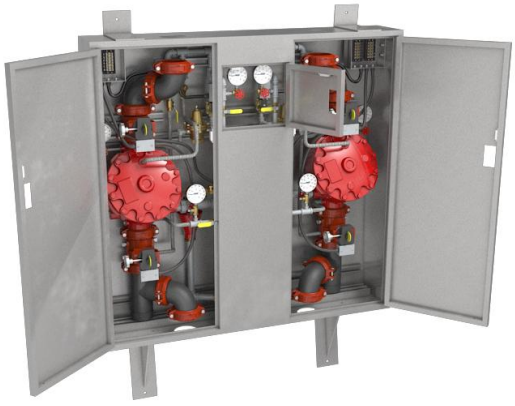
To address these challenges, the Port of Miami Tunnel Project turned to National Fire Protection, LLC headquartered in Rockville, MD as its contractor. With successfully completed projects that include the Pentagon, Dulles International Airport, the US Coast Guard Headquarters, Marlins Ballpark, and Miami International Airport, NFP was well suited for a job of this magnitude.

After NFP's initial review of system and component specifications, they recognized a number of roadblocks:

1) Their initial valve selection could not supply the required flow rate
2) Friction losses were very high
3) Ferrous metal components did not meet the D.O.T. requirement for 100% U.S. sourced materials.

NFP brought these and other design criteria to Viking. With a plywood mock-up as a starting point, Viking was able to specify a 100% US-sourced valve rated for the required 1,100 gal/ minute flow rate, design a contoured control cabinet that fit perfectly within the curvature of the tunnel wall, and develop a total package assembly/test/shipping process that delivers a "plug and play" system to the construction site. A 3D model was delivered within 2 weeks of Viking's engagement, and the next 6 months were spent working with NFP to refine the details so that the design met every POMT performance requirement.

(Continued on page 2.)



Viking on/off deluge cabinet system with Viking Model J-1 flow control valve, pressure regulating trim, and on/off impulse valve that remains in its last powered state to ensure continued operation in the event of a power interruption.

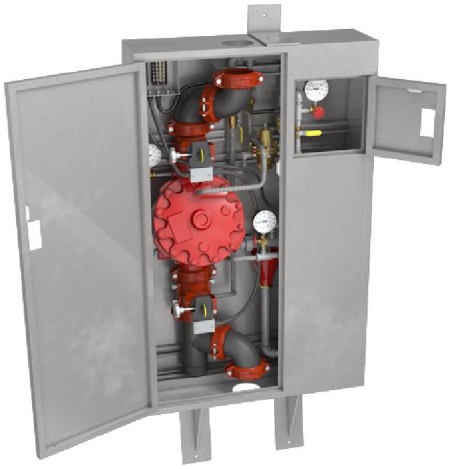
(Viking Tunnel Deluge System, page 2.)

A visual monitoring system with immediate on/off actuation was required to insure that system controllers could send water to any zone in a matter of seconds. Zones can also be actuated from their individual cabinets, which are not locked and are clearly marked with operating instructions. Cabinet doors are equipped with alarms that alert operators when the cabinets are accessed.

Among the Viking system's unique features:

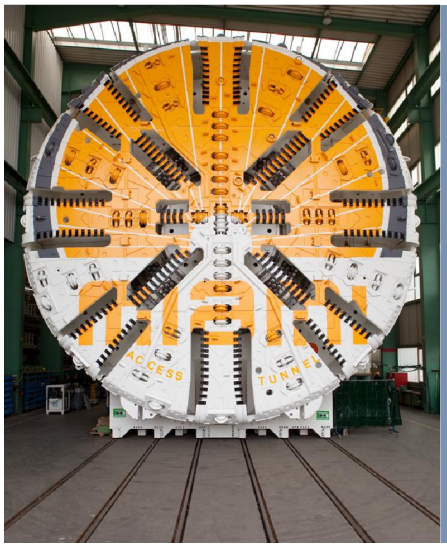
- The system is electrically operated. An impulse valve is utilized in lieu of a standard normally closed solenoid valve, so the system stays latched in its last operating state. If for whatever reason wiring is breached during an activation, the system will continue to operate.
- All components, including the fasteners, are sourced in the United States, and the entire system is manufactured in Viking's plant in Hastings, Michigan. Domestic sourcing allows tax credits to be applied on the entire system.
- Viking created a custom assembly process to ensure consistency and quality control across all 42 zone systems. The shipped product is a fully trimmed assembly with grooved fittings and hoses attached, and arrives at the construction site in the cabinet and ready to connect to the water input. Every unit is leak and function tested before it leaves the factory. Two trained and experienced assemblers are dedicated to the project to ensure each system is identical and in perfect working order.

According to Martin Workman, VP of Product Development for Viking, "This project presented a design and domesticity challenge that we were well equipped to meet. Viking manufactures valves for flow rates anticipated in fire protection systems, and provides a domestic product that meets government specifications. Our Purchasing and Quality departments were able to provide material certifications for all items in the on/off deluge cabinets that satisfied everyone's requirements. Both National Fire Protection and the Port of Miami were extremely pleased with the result."



The Viking Single Cabinet System is shown above. The project includes two single-system and 40 dual-system cabinets. Components and features include:

- *Water supply shut-off valve and system isolation valve*
- *Valve riser designed for immediate open/close*
- *Remote activation and reset*
- *Impulse valves to control priming water pressure via switch in attended control room*
- *Door alarm switches that report to the SCADA system when emergency release doors or main riser doors are opened*



Port of Miami Tunnel Facts:

Nearly 16,000 vehicles travel to and from the Port of Miami through downtown streets each day. The new tunnels will lower Port user costs, increase safety, and drive economic growth.

Excavation was accomplished using a Tunnel Boring Machine (shown at left) designed specifically for the tunnel's geology. The cutter head outside diameter is 42.3 feet.

About Viking...

Viking has over 90 years of experience with all types of fire detection and suppression challenges. The company has participated extensively in sprinkler industry committee and code/standards-making bodies. The company's breadth of product line, including Viking water systems and Minimax gas and clean agent systems, can deliver an integrated solution for any fire protection challenge.

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