

**Automatic Water Wall System with PLC programmed electric monitors for mitigation and dispersion of HF and toxic gas releases**

The use of toxic gases (for example HF - hydrofluoric acid - as catalyst in the alkylation unit) is very diffused in the refineries and petrochemical industries, a process that produces high-octane gasoline. Their accidental release can cause serious health effects or even death if an individual is exposed to low or to moderate concentrations. However, most of the toxic gases, and in particular HF, are very soluble in water and water mitigation is effective to combat any accidental toxic gas or HF release.

Caccialanza & C. designs and supplies water-wall systems consisting of rows of A6-El or A4-El monitors with specially designed adjustable water nozzles for wide cone and narrow cone fog jet operation, which are installed around the unit on all sides to generate the water wall. Spray curtains are used instead of monitors in congested areas where there is insufficient clearance for the wide-cone nozzles.

In the event of HF or toxic gas release, the gas detectors distributed in the protected plant will automatically activate the water mitigation system within seconds and deliver a large amount of water to form a mitigating wall that extends high into the air.

A PLC selects the proper water-wall configuration based on meteorological conditions and automatically aims momentum-breaking monitors based on the location of the activated HF or toxic gas detector.

At high wind the PLC will activate the aim-and-shoot strategy by selecting and aiming the most effective monitors.

The emergency response can be observed by the operators in the Control Room with a number of surveillance cameras that provide video monitoring with views in real-time, delayed time and freeze-frame recording. Guided by these observations, the trained operator can adjust the automatic response to improve mitigation effectiveness.

In summary, the water mitigation design offers a system that:

- provides good mitigation efficiency over a wide range of potential release conditions
- allows a high percentage of the total water to effectively contact the vapor cloud
- minimizes the possibility of vapor cloud by-pass.

In addition to supplying the water-handling equipment for the water-wall, Caccialanza & C. is in a position to provide the support required to evaluate a variety of alternatives for consequence reduction.

Caccialanza & C. can then assist in preparing the design basis for all aspects of the selected consequence-reduction system.

The Water Wall system is one of a number of consequence reduction measures that can be taken to significantly reduce the potential injury to employees and the public in case of toxic gas releases.

The "Water Wall Monitors" manufactured by Caccialanza & C. were first selected in the year 1999 by ExxonMobil for the Esso Augusta Refinery in Italy, as the monitors design was "full in line" with the specifications indicated in the "Water Mitigation Template" prepared by ExxonMobil for the worldwide affiliates.



The "Template" document includes the results of the mitigation and cloud dispersion models and gives a base strategy for the mitigation design, that is considered the "state-of-art design" by the Industry after it was presented at API Symposium on HF in 1998.

In particular, the pressure balance nozzles supplied by Caccialanza have passed all field tests carried out by ExxonMobil before being included in the Water Mitigation Template.

Our Company is kept permanently on-line with the feedback received by the continuous contacts with the Water Wall Specialists.