



Case Study: Community Safety - A Dow Chemical Priority

“Just watch what happens. You can see how the system models the plume’s dispersion across the site. SAFER Real-Time gives us a real time dispersion scenario on our screen within seconds of an incident occurring.”

– Don Watson, Dow Chemical Emergency Services and Security

THE CHALLENGE

Dow Chemical Canada’s Fort Saskatchewan site has utilized a gas dispersion-modeling platform for emergency response purposes since 1987. The focus has always been to safeguard the lives and property of communities surrounding the site—part of Dow’s ongoing commitment to maintaining the highest level of community, employee and industry safety. In 1996, the Fort Saskatchewan site implemented a computer modeling system for chemical releases that could potentially impact off-site locations.

In 2001, a search for a **new emergency response gas dispersion program** began. Then, in 2004, the new Environment Canada “Environment Emergency Plan” (EEP) requirement mandated the site have the capability to provide communities with prompt and reliable notification of toxic releases. This requirement intensified their efforts to find the right solution.

In addition, expectations regarding community notification during an incident or industrial accident were high in the Fort Saskatchewan area.

Dow needed a solution that would provide fast, accurate and real-time modeling to ensure that community notification systems could be activated in a timely and responsible manner.

As a member of the Canadian Chemical Producers Association (CCPA), Dow Canada is committed to Responsible Care®, a set of initiatives undertaken by all CCPA members to help safeguard employees, the environment and the communities in which they operate.



Background

The Fort Saskatchewan site began manufacturing products for the agricultural, oil, gas, transportation, and pulp and paper industries in 1961. Dow moved into the area because of the availability and low cost of natural resources to make its products. The facility is both a Manufacturing Site and an R&D Facility.

Fort Saskatchewan's 2,128 acre manufacturing site uses natural gas and salt to produce basic chemicals and plastics. Natural gas liquids are brought into the site's Fractionator plant by pipeline and separated into five hydrocarbon products: ethane, propane-plus, propane, butane and pentane-plus. The Fractionator plant delivers four products to customers outside Dow and uses the ethane to make ethylene, which is used on site to make a number of other chemicals, including polyethylene and ethylene dichloride. The latter is reacted with chlorine to make vinyl chloride monomer. This product is used by customers to make finished products like vinyl siding and garden hoses. Ethylene oxide and ethylene glycol are also produced in-plant and used by customers to make coolants such as antifreeze and aircraft de-icer.

Facility Issues

Dow's Environmental Health & Safety teams identified the emergency response boundaries and criteria the new system had to meet. They were looking for a system that was recognized and accepted as an industry best practice solution but also had to be cost competitive and user friendly. Twenty-four hour support was also a priority, with system experts readily available to assist at any given time via telephone, Web interface, or travel to the site as required. Finally, the solution had to meet with the approval of a variety of stakeholders including a global expertise center, as well as experts from the Dow Engineering Design and Process Safety organizations.

The Solution

After three years of research and evaluation of a range of solutions, the majority with a risk assessment focus, SAFER Real-Time® was chosen as the best practice solution to enable the site to satisfy its mandate. SAFER Systems had over 20 years of successful implementation at some of the largest and most influential Fortune 500 companies and provided the fast, reliable, real-time modeling needed for timely emergency response and community notification.

SAFER Real-Time® is a site-specific emergency response system for chemical accidents or releases that runs under the Microsoft Windows 2000 and XP operating systems on PC-compatible hardware. Sophisticated mathematical algorithms combine weather information with site-specific data (chemical/physical properties, release scenario, topography) to predict toxic vapor cloud, fire, and explosion impact within the Fort Saskatchewan facility and surrounding areas. Wireless, GPS enabled gas sensors and an array of existing fixed sensors are connected to SAFER's patented Advanced Back Calculation technology to provide release rate estimation, greatly improving the accuracy of Dow Chemical's predictions.

Implementation

What it takes to implement a Turnkey System

Dow chose a modified turnkey approach to implement their system. SAFER Systems provided meteorological and gas sensor hardware and software and performed the meteorological installation. SAFER Systems was on-site for two days to get the system up and running. One additional day was required to tie in a Modbus connection to a regional air shed environmental monitoring network. This was needed to add two additional meteorological stations and a number of fixed sensors at and beyond the plant site perimeter.



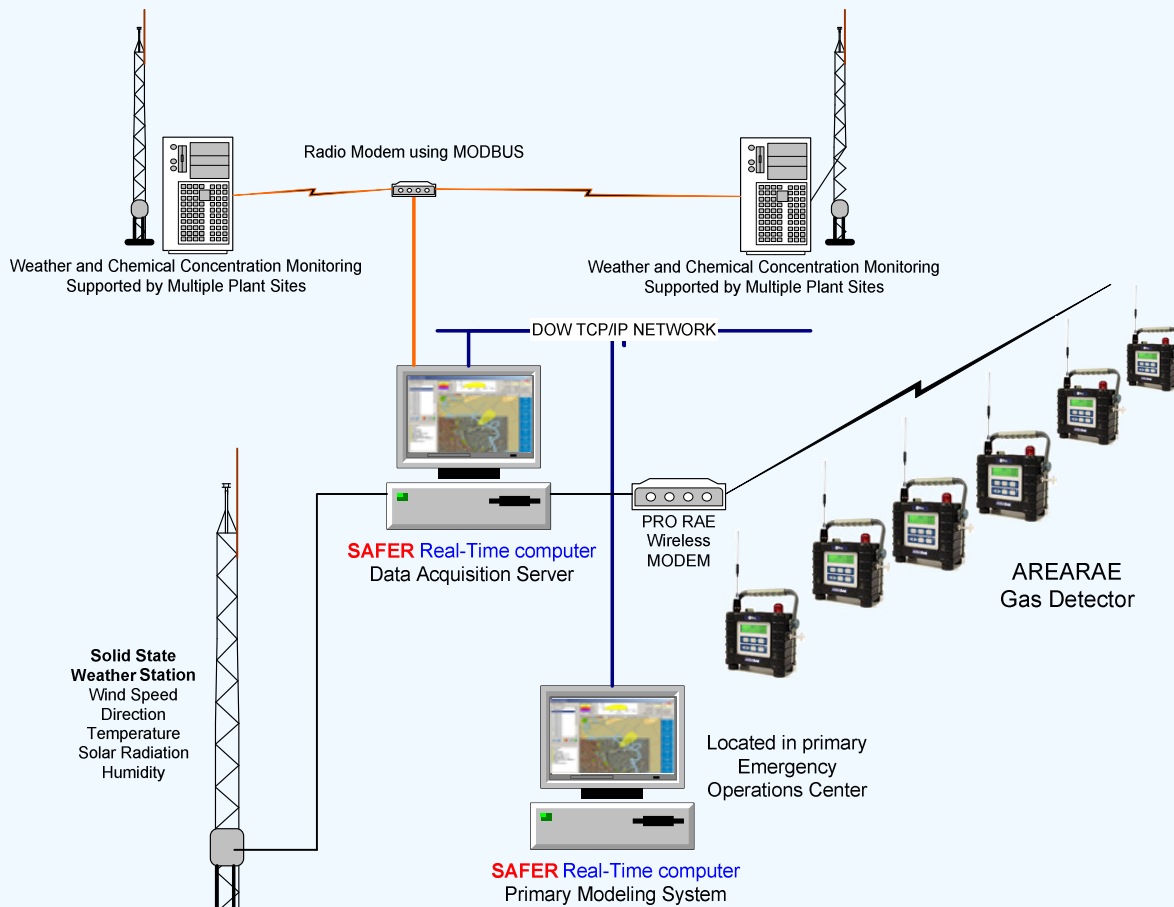
Dow placed a priority on making it easy for everyone to routinely see the daily operation of the system.

In the Emergency Operations Center, remote monitors emulate the activity occurring at the base station.



Development of scenarios using its new SAFER Real-Time® is much less labor intensive for Dow than programs used previously. Although not all scenarios have been completed to date, a comprehensive list of chemicals on the site is in place so that manual modeling inputs can be made to support all operating units. Additionally, Emergency Response personnel can now model scenarios contained in the “pre-plans” from fire, explosion, and release perspectives and more effectively plan deployment of Command Posts and resources based on model estimates.

SAFER Systems provides ongoing customer support including software upgrades, continuing operator training, and test & verification of key components such as the meteorological hardware. Initial training was completed within the specified time, and monthly reviews and skills improvement sessions are ongoing.



Effective Emergency Response

SAFER Real-Time® has been integral to effective site emergency planning exercises, with outstanding success. Emergency Response mode operators were delighted with modifying the “canned” release (using archived historical MET data), measuring exposure rates at various locations within the plume, and evaluating the potential of a vapor-gas explosion.

The Public Affairs group is excited about the opportunity to streamline their offsite notification process, and the Environmental group has moved their real-time ambient air alarm monitoring to the SAFER Real-Time® Sensor Monitor. Now when an alarm occurs, the Security Center can see and track the situation.



Conclusion

Objectives

- Respond to the 2004 Environmental Canada "Environment Emergency Plan" mandate.
- Provide fast, accurate and real-time modeling to ensure timely notification to the community.
- Find a system that is recognized and accepted as an industry best practice solution.
- Provide a user-friendly solution, with 24 hour support.

Solutions

- Site-specific chemical emergency response system with sophisticated mathematical algorithms.
- Weather information is combined with site-specific data to predict impact from vapor cloud or fire and explosion.
- Wireless GPS enabled gas sensors and fixed sensors enable Advanced Back Calculation to estimate release rate.
- Pre-defined scenarios enhance speed and accuracy of incident planning and response.

Results

- Public Affairs can streamline their offsite notification process.
- The Security Center can see, track, and respond to an alarm.
- Dow Fort Saskatchewan has a reliable, state-of-the-art, and effective system for response to toxic gas releases.
- Several Dow Alberta neighbors are using SAFER Systems technology.

Dow Fort Saskatchewan has kept its commitment to Environment Canada and to the community to have a reliable, state-of-the-art and effective technology for response to toxic gas releases. Many of Dow's Alberta neighbors, including Strathcona County, the cities of Calgary and Edmonton, both major Canadian railways (CN and CP Rail), Nova Chemicals, and Sherritt International are using SAFER Systems' technology, confirming its far-reaching acceptance by municipalities and major industries alike.



Dow's Fort Saskatchewan site no longer has to rely on potentially unreliable, manual, paper plume dispersion modeling. As well, they no longer have to use personnel to collect samples within the path of a toxic cloud. The SAFER Real-Time® solution was implemented because it is operator friendly and cost effective, provides extremely fast models, and can be run manually (without a pre-defined scenario) if you opt to model a situation manually. Dow has achieved everything it set out to do when it began its search for a solution. Most of all, the protection provided for employees and the community is unsurpassed.

About SAFER Real-Time

SAFER Real-Time provides a response system designed to improve the management of a toxic emission from a loss of containment event. The program includes multiple strategies allowing evolution of the response activity based on what is known at the time. A patented technology provides release rate estimation, improving the accuracy of the predictions. Information regarding historical path, current impact, future impact, building infiltration, and detailed reporting improves response communication. Options available include terrain effects, liquid multi-component modeling, weather and gas sensor networks, and customized modeling such as hydrogen fluoride. Areas of use include emergency response, drills, awareness with safety training, meeting regulatory requirements, and post-event legal defense. SAFER is a system integrator and can provide a scalable application that may be designed for anything from small repackaging facilities to major industrial sites to entire countries.

About SAFER Systems

For over twenty-five years, SAFER Systems has been the global leader in chemical emergency response solutions. SAFER Systems provides Fortune 500 corporations, including Dow, DuPont, GE, and Honeywell, and government entities with emergency response management, consequence analysis and software engineering solutions.

For more information about SAFER Systems, please contact us at (800) 621-7237, (805) 383-9711, or info@safersystem.com or go to our web page: <http://www.safersystem.com/>.