



# ioView

*"This SEP focuses heavily on compliance with RAGAGEP (recognized and generally accepted good engineering practice) in addition to regulatory requirements."*

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*"The new documentation requirements for relief device design are extensive"*

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## OSHA Announces PSM Special Emphasis Program for Refineries under CPL 03-00-004

On June 7, 2007 OSHA announced a Special Emphasis Program (SEP) on Process Safety Management (PSM) for refineries. This program will apply to all refineries and will be implemented over the next two years. The basis for OSHA's program is that since the PSM standard was promulgated, the petroleum refining industry has experienced the most fatal (36) or catastrophic incidents. This SEP focuses heavily on compliance with RAGAGEP (recognized and

generally accepted good engineering practice) in addition to regulatory requirements. Topics will include: management of change, relief systems including blowdown drums and vent stacks, vessels, piping, operating procedures, findings and recommendations, facility siting, human factors, employee participation, training, P&ID verification, contractor safety, safe work practices, pre-startup safety review, hot work permits, incident investigation and emergency planning

and response. Although this program is focused on refineries, the focus items apply to all facilities covered under PSM.

Click on this link to download: [CPL 03-00-004](http://www.osha-slc.gov/cpl/03-00-004.pdf)

ioMosaic Corporation engineers have been implementing and auditing PSM programs for over 15 years. We wrote the, "Guidelines for Auditing PSM Systems" for CCPS. We understand RAGAGEP and can help your company comply with these new OSHA requirements.

## How the Updated API Standard 521 Impacts You

The American Petroleum Institute (API) recently issued Standard 521 5th Edition, "Pressure-relieving and Depressuring Systems". In the 10 years since the 4th edition of the recommended practice was issued, industry has made several advancements in the field of emergency relief system design, and gained a significant understanding of necessary relief system documentation and appropriate design methodology. The new standard incorporates the latest developments.

Highlights of the latest edition of ANSI/API Standard 521 include discussion of the following subjects:

- ◆ *Overpressure protection philosophy*, including: Multiple Jeopardy, Operator Error, and Instrumentation Credits

- ◆ *Recommended Minimum Relief System Design Content*, including: Relief system information, description of protected components, design codes / standards, analysis of causes of system overpressure
- ◆ *Items Required in Flare-Header Calculation Documentation*, including: description of initiating event and intermediate consequences, system schematics, Disposal system loads, instrumentation credits and failures
- ◆ *Dynamic Simulation*, as a particularly useful tool for flare system analysis and better defined relief loads than generally conservative conventional methods
- ◆ Application of *High Integrity Protection Systems (HIPS)* principally to: eliminate overpressure scenarios, eliminate relief

devices, provide system overpressure protection, reduce the necessary size of disposal systems by reducing the probability of simultaneous relief and reduce risk by reducing the demand rate on a relief device

ioMosaic Corporation has extensive experience in emergency relief system design including providing detailed documentation, maximizing the functionality of your flare system, performing dynamic analyses using [SuperChems™](http://www.superchems.com), and developing detailed HIPS specifications.

We would be happy to help you and your company take advantage of the opportunities presented in the API Standard 521. Further information regarding our services and experience can be found at [www.iomosaic.com](http://www.iomosaic.com).

## In the News

### QRA and ERS: An Integrated Approach

*“At facilities where relief valves can vent toxic and flammable materials directly to the atmosphere, these discharges can be a significant contributor to overall risk”.*

Quantitative Risk Analysis (QRA) and Emergency Relief System (ERS) Analysis are both components of a successful Process Safety Management Program. While both studies often share the same information, they tend to remain separate, independent, studies. However, at facilities where relief valves can vent toxic and flammable materials directly to the atmosphere, these

discharges can be a significant contributor to overall risk.

ioMosaic Corporation has recently performed studies combining QRA and ERS techniques for major chemical companies. The integrated approach realized many benefits. Efficiency was gained in terms of data collection, data sharing and information management. The

existing Emergency Relief System was analyzed for its adequacy; while the Quantitative Risk Analysis considered various hazard scenarios throughout the plant, including relief device discharge.

Using a case study, this paper outlines the methodologies used, and the risk mitigation options proposed.

[Get Complete Whitepaper](#)

### Recent Facility Siting Developments

*“The BP Texas City explosion two years ago tragically highlighted the importance of facility siting, particularly when considering portable buildings.”*

The American Petroleum Institute recently issued Recommended Practice 573, "Management of Hazards Associated with Location of Process Plant Portable Buildings". The BP Texas City explosion two years ago tragically highlighted the importance of facility siting, particularly when considering portable buildings.

API RP 573 provides guidelines based on the following principles:

- Personnel should be located

away from covered process areas, consistent with safe and effective operations.

- The use of occupied portable buildings in close proximity to covered process areas should be minimized.

- The occupancy of portable buildings should be assessed and managed, especially during periods of increased risk including unit start-up or planned shutdown operations.

- Portable buildings should be

designed, constructed, installed, and maintained to protect occupants against potential hazards.

Additionally, specific recommended distances are provided for any portable building located in one of three applicable hazard zones.

[ioMosaic Corporation](#) has extensive experience in facility siting studies, and explosion modeling. We are currently involved in several such studies, and may be able to assist your company to address these issues.

## Software Updates

### HAZOPtimizer™

ioMosaic Corporation had decided extend our FREE OFFER (limited time only) for [HAZOPtimizer™](#) version 4.0. Since the release of version 4.0 in February of 2007, more than 160 users have registered and downloaded the free software. [HAZOPtimizer™](#) users are not limited to the USA, we have users from Australia, Brazil, China, Croatia, Germany, Italy, Pakistan, South Africa and even Yugoslavia.

To download your free copy of our [HAZOPtimizer™](#) software, please [Register Here](#). Upon registration, you will be eligible to receive software updates such as the new LOPA template in version 5.0, which will be available soon.

[HAZOPtimizer™](#) offers the following advantages:

- ◆ Can be used for any Process Hazard Analyses (PHA) technique, including HAZOP, FMEA, What If, and Checklist
- ◆ Automatically generates recommendations sorted by Risk Level Recommendations can be downloaded directly to [ioXpress™](#) for tracking action items
- ◆ Contains default phrases to simplify recording
- ◆ Automatic item numbering and renumbering when new rows are added
- ◆ Unit conversion utility to easily switch from English to SI units
- ◆ Configurable up to 5 x 5 risk matrix
- ◆ HAZOP Deviation Matrix

New Features:

- ◆ Table of contents (TOC) tab to summarize the study Sections when user clicks on the Summary button
- ◆ Option to allow user to define the starting Section number
- ◆ An attendance sheet tab for tracking the participants' attendance
- ◆ Option to enable the print setup to activate sheet or entire workbook
- ◆ Option to make the Comments/Questions column optional for printing
- ◆ Export recommendations to [ioXpress™](#) for web-based action tracking
- ◆ Automatically calculates the risk level based on the likelihood and severity range

Download  
HAZOPtimizer 4.0

**FREE!**

[here](#)

## Software Updates

**SuperChems™** is an advanced software tool for relief systems design, chemical reactivity assessment and management, consequence analysis, and Quantitative Risk Analysis (QRA).

- ◆ Developed in 1989 by Arthur D. Little
- ◆ Used by leading companies, industry associations, and government agencies worldwide; there are now more than 300 users.
- ◆ Selected by AIChE/DIERS in July 2002 to replace the SAFIRE code
- ◆ Recognized by the state of New Jersey DEP, and the State of California
- ◆ Offers simple relief design techniques for non-experts
- ◆ Offers dynamics, reactivity, and effluent handling designs for power users

**SuperChems™ Expert** (Available from ioMosaic) features:

- ◆ Relief System Evaluation & Design (including Flares & Effluent Handling)
- ◆ Chemical Reactivity Assessment & Management
- ◆ Consequence Analysis (Fires, Explosions, Dispersion)
- ◆ Quantitative Risk Analysis

**SuperChems™ for DIERS** (available directly from AIChE) features:

- ◆ Relief System Evaluation & Design

**SuperChems™** is the industry “gold standard” for design/rating of emergency relief systems (ERS) and effluent handling equipment. Risk Management, including QRA, capabilities are now included in **SuperChems™ Expert**. **SuperChems™** is the only software product that enables all steps in a QRA to be done on the same platform. The QRA results can be displayed as risk contours that are overlaid on GPS maps of one facility. Other advantages of **SuperChems™** include:

- ◆ Windows Based Software
- ◆ Peer Reviewed and against AIChE DIERS Benchmarks and largescale field data
- ◆ Integral Physical Property Data Base
- ◆ Extensive Integral Data Base of Manufacturer Data on Rupture Disks and Relief Valves
- ◆ Truly handles mixtures and multi-component systems in all models
- ◆ Integral Kinetics Package for Reactive Chemicals
- ◆ Down Stream Effluent Handling, including Flares and Vent Headers, can be Designed/Rated
- ◆ The best Source Term for flow models in the Industry
- ◆ Integral Source Term for Dispersion Modeling
- ◆ Consequence Analysis (Ground Level Concentrations, Unconfined Vapor Cloud Explosion, Fireballs): this Capability includes Analysis of LNG Spills/Releases
- ◆ Quantitative Risk Analysis (QRA) Capability, including Risk Profiles & Contours
- ◆ Report Generator

**ioXpress™** Benefits include:

- ◆ Easily configured to manage exiting PSM processes, such as management of change and incident investigation and auditing
- ◆ Track and manage PHA Findings, including Continuous PHA Revalidation™
- ◆ Import PHA recommendations directly from HAZOPtimizer™ will integrate with other PHA software
- ◆ Significant productivity gains-savings should pay for the software in 6 months or less

**ioXpress™** is a web-based workflow process and knowledge management solution that operates on a Microsoft SQL Server platform. ioXpress is designed to help companies leverage “unstructured” corporate data for business advantage and learning. ioXpress can administer workflow, manage data and documents, enable knowledge sharing, and enhance communication. All document collections are categorized, centralized, and managed through a secure web-based data platform. **ioXpress™** can be configured to the needs of a specific Corporation.

There are currently two versions of **ioXpress™**: Basic and Workflow. The Basic version is a knowledge management system that manages unstructured data including electronic documents and dynamic forms including Engineering Drawings (AutoCAD and Visio), Databases, Email, HTML, ASCII Text, Portable Document Format (PDF), and all Microsoft Office documents.

**ioXpress™ Basic** comes with an Action Tracking module which allows action items to be entered directly or imported and then managed and tracked to completion. The **ioXpress™ Workflow** version adds a workflow and business rules engine that enables management of entire business processes such as management of change (MOC), auditing, task management, and incident investigation. In turn, **ioXpress™** can generate any necessary reports.

The **ioXpress™ MOC** module is a comprehensive visual workflow that guides the user through a step-by-step process for standard MOC functions such as MOC initiation, approvals, process hazard analysis (PHA), pres-start-up safety review (PSSR), start-up authorization, etc. **ioXpress™** can produce significant improvements in MOC efficiency and effectiveness. One of the major efficiencies is the ability to revalidate your PHA after each MOC or Continuous PHA Revalidation™. This workflow engine can easily and cost-effectively be configured to conform to a site's specific procedures.

### Competitive Upgrade

If you are a current PHAST™ and/or SAFETI™ user, contact us for a competitive upgrade to SuperChems™ offer.



[www.ioxpress.com/mocdemo](http://www.ioxpress.com/mocdemo)

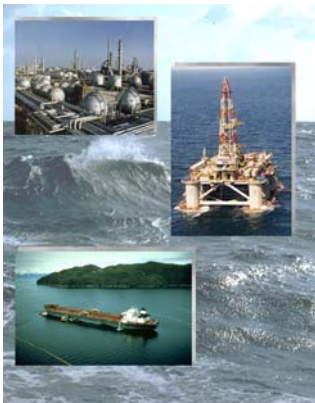
### ioXpress™

Benefits include:

- ◆ Easily configured to manage exiting PSM processes, such as management of change, incident investigation and auditing
- ◆ Track and manage PHA Findings, including Continuous PHA Revalidation™
- ◆ Import PHA recommendations directly from HAZOPtimizer™ will integrate with other PHA software
- ◆ Significant productivity gains-savings should pay for the software in 6 months or less

For more details on any of our courses please visit our website [www.ioMosaic.com](http://www.ioMosaic.com) or contact us at ioMosaic 603-893-7009 or [support@iomosaic.com](mailto:support@iomosaic.com)

### [Training Calendar Here](#)



### [SuperChems™ Users Group Meeting, Managing LNG Risks, Effective ERS Design and Consequence Analysis & Modeling](#)



### **ioMosaic's 1st Annual SuperChems User Group Meeting**

January 16-17, 2007  
Houston Texas

## [ioMosaic Training Courses](#)

### [Effective ERS Design Training](#)

ioMosaic has developed an [Effective ERS Design](#) course with the objective of offering operating companies, engineering firms and regulatory agencies with a structured and comprehensive training program for a wide range of ERS design, risk management and

compliance issues. This program offers core modules plus a wide choice of electives directed towards more complex ERS design challenges and methodologies.

Effective ERS Design is offered on September 12 - 14, 2007

in our Houston office. There are a few seats left so register now.

Please visit our [website](#) for specific details on the course dates and topics.

[Registration](#) is now open.

### [DIERS Users Group Fall Meeting](#)

The [Design Institute for Emergency Relief Systems](#) (DIERS) Users Group Fall Meeting will be held October 8 -10, 2007 at the [Highlander Inn](#) and Conference Center in Manchester New Hampshire.

For further information and details on this meeting, please [Click Here](#).

In order to attend the DIERS Users Group Meeting, you must be a DIERS member.

To become a member, please [Register Here](#).

[Registration](#) is now open for the 2007 Fall DIERS Users Group Meeting.

### [Managing LNG Risks Training](#)

ioMosaic has developed a comprehensive LNG training program, [Managing LNG Risks - Separating the Facts from the Myths](#). This course is offered on November 5 - 6, 2007 in Houston, Texas.

This two-day course provides an overview of unique LNG hazards such as pool forma-

tion, rollover, dispersion, fire and explosion, etc., associated modeling techniques, and risk management methodologies. References will be drawn to previous LNG incidents, test programs and applicable regulations throughout the discussion. This course is ideally suited to anyone working

for or associated with the LNG industry, particularly those involved in LNG project development, operations, and safety and risk management.

The program will be conducted by some of the world's foremost LNG specialists.

[Registration](#) is now open.

### [SuperChems™ User Group Meeting](#)

ioMosaic Corporation held the first Annual SuperChems™ User Group Meeting in Houston on January 16 & 17, 2007.

The two-day event gave users training in advanced SuperChems modeling techniques. Topics covered included Emergency Relief System Design, Modeling Vent

Headers, Low Pressure Vent Design, Dynamic Modeling, Consequence Modeling & Quantitative Risk Analysis, and Reactive Systems modeling.

Users were also given an update of forthcoming SuperChems developments, as well as having the opportunity to provide their own suggestions for future enhancements.

Audience participation was encouraged, with plenty of lively Q&A throughout both days.

The second annual SuperChems User Group meeting is scheduled for January 14 - 15, 2008.

[Registration](#) is now open.

### [Consequence Analysis & QRA Elective Course](#)

This four day course is a comprehensive discussion on the concepts and principles of [Consequence Analysis & Modeling](#) as well as [Quantitative Risk Analysis Elective](#). These courses address both how and why hazardous incidents occur.

Case histories and hands-on

computer modeling will be employed throughout the course to enable participants to apply the knowledge on real plant problems.

Topics will include Regulatory requirements, Fundamentals (thermodynamics, chemical kinetics, heat transfer, combus-

tion, transport, meteorology), Quantitative risk analysis, Source term characterization, Dispersion analysis, Fire Modeling, Large-scale test validations, Explosions and Case Studies.

We are offering these courses in Houston Texas in 2008.

## ioMosaic Corporation News

### Congratulations to Fred Dyke on his Retirement

After 46 years of working in the area of process development, engineering design, plant operations, and risk assessment, Frederick (Fred) Dyke retired from ioMosaic on April 30, 2007. Fred was the fourth employee to join ioMosaic, from Arthur D. Little, in April, 2002 when ioMosaic was in its

early days and has been with the company for five years. He feels that in spite of the many challenging assignments he has had as a Chemical Engineer his lasting memories will be of the many wonderful people he has had the opportunity to meet and work with over the years.

In retirement Fred is looking forward to having more time to spend with family and friends and pursue his longtime interest in photography, woodworking, bike riding, and reading. He does not expect to be bored or inactive.

We wish you the best Fred!



**Frederick Dyke**  
ioMosaic Partner  
Retires after 46 Years  
as a Chemical Engineer

### Flash Demonstrations

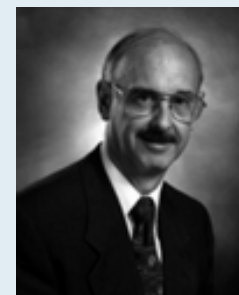
ioMosaic is in the process of converting our SuperChems™, ioXpress™, and ERS demonstrations from Microsoft LIVE Meeting to our very own flash demonstrations. We are very excited about this upgrade and will send further details once this is complete.

### R. Peter Stickles named Fellow of AIChE

ioMosaic is proud to announce that R. Peter Stickles, Senior Partner at ioMosaic, was elected as Fellow from The American Institute of Chemical Engineers (AIChE).

Mr. Stickles has been an active member of AIChE throughout his career. He has served on numerous national committees and has held leadership positions in the Boston chapter.

This election process requires nomination, then election by the AIChE Board of Directors. It is a great achievement for Mr. Stickles. Please join us in congratulating him.



**R. Peter Stickles**  
ioMosaic Senior Partner  
Elected Fellow of AIChE

### ioMosaic Continues to Grow

ioMosaic continues to grow and we are pleased to introduce Ricardo Davis as Partner in our Houston Texas office. Mr. Davis joined ioMosaic in April

of 2007 as an ERS Engineer. Please join us in welcoming Mr. Davis to ioMosaic.

If you would like to learn more

about become a member of ioMosaic Corporation, check out our career opportunities at [www.iomosaic.com](http://www.iomosaic.com).

### ioMosaic Partners with AmbSeg Engenharia Ltda

ioMosaic Corporation recently signed a partnership agreement with AmbSeg Engenharia Ltda; a Brazilian risk and safety consulting company.

The agreement, which covers process safety consulting services, as well as software distribution, strengthens ioMosaic Corporation's commitment to doing business in South America.

The companies have found a number of ways to cooperate. Recently, they jointly conducted several Quantitative Risk Analysis studies for clients in Brazil, using SuperChems™ Software.

In July ioMosaic Corporation presented a "Consequence

Analysis and Modeling" training course with a "Quantitative Risk Analysis" elective, hosted by AmbSeg Engenharia Ltda, in Salvador Brazil. The course was a great success.

The companies will also be presenting a collaborative paper at the 2007 Rio Pipeline Conference in October.

*"This is definitely a win-win situation for both companies", said Neil Prophet of ioMosaic Corporation. "The amount of cooperation, energy, and enthusiasm from both parties is making this a very successful and exciting partnership."*

Luis Sávio Sousa of AmbSeg says, "We are very proud of being able to bring to our customers in Brazil and potential customers in South America the expertise of very experienced and internationally known safety and risk management professionals. Combined with the powerful resources of SuperChems™, and the experience of professionals familiar with the local market and culture, this will certainly provide highly competitive opportunities to our customers to improve their industrial and environmental safety performance".

AmbSeg Engenharia Ltda  
<http://www.ambseg.com.br/>

### ioMosaic Corporation & AmbSeg Engenharia Ltda Present.....



**Consequence Analysis & Modeling course in Salvador, Brazil**  
July 9 - 13, 2007

**ioMosaic Corporation Quarterly News**

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Discovering Solutions to Safety and Risk Management

[www.ioMosaic.com](http://www.ioMosaic.com)

Founded by former Arthur D. Little Inc. executives and senior staff, ioMosaic Corporation is the leading provider of safety and risk management consulting services. ioMosaic has offices in Salem, New Hampshire and Houston, Texas.

Since the early 1970's, ioMosaic senior staff and consultants have conducted many landmark studies including an audit of the Trans-Alaska pipeline brought about by congressional whistle blowers, investigation of the Bhopal disaster, and the safety of CNG powered vehicles in tunnels. Our senior staff and consultants have authored more than ten industry guidelines and effective practices for managing process safety and chemical reactivity and are recognized industry experts in LNG facility and transportation safety.

ioMosaic Corporation is also the leading provider of pressure relief systems design services and solutions. Its pressure relief system applications are used by over 250 users at the world's largest operating companies. It holds key leadership positions in the process industries' most influential and active pressure relief system design, and chemical reactivity forums, and plays a pivotal role in defining relief system design, selection, and management best practices.

[Whitepapers Library Link](#)

**Safety & Risk Management Consulting Services**

- ◆ Auditing
- ◆ Calorimetry, Reactivity, and Large-Scale Testing
- ◆ Crisis Management Support and Training
- ◆ Due Diligence Support
- ◆ Effluent Handling Design
- ◆ Facility Siting
- ◆ Fire and Explosion Dynamics
- ◆ Incident Investigation, Litigation Support, and Expert Witness
- ◆ Liquefied Natural Gas (LNG) Safety
- ◆ Pipeline Safety
- ◆ Pressure Relief Design
- ◆ Process Engineering Design and Support
- ◆ Process Hazards Analysis
- ◆ Process Safety Management
- ◆ Risk Management Program Development
- ◆ Quantitative Risk Assessments (QRAs)
- ◆ Structural Dynamics
- ◆ Training

**Software Products:**

**ioXpress™** (Enterprise Knowledge, Management of Change (MOC), and Information Management).

**SuperChems™** (Advanced Pressure Relief Design, Reactivity Management, Consequence Analysis, and Quantitative Risk Analysis).

**HAZOPlimizer™** is a software product for recording and managing process hazard analysis.

***SuperChems™ Software***  
***SuperChems™ is a sophisticated tool for consequence analysis and among other things can be used to analyze LNG spills, Rollover, dispersion, and fire hazards.***  
***For more information go to:***  
***[www.ioMosaic.com/iososaic/products/products.html](http://www.ioMosaic.com/iososaic/products/products.html)***  
***or contact us by email:***  
***[lng@iomosaic.com](mailto:lng@iomosaic.com)***