Retired OxyChem Executive Named Associate Director

David J. Willette, recently retired Occidental Chemical Corporation vice president, has been named associate director of the Mary Kay O’Connor Process Safety Center. Willette, who joined the Center on August 1, will have responsibility for developing collaborative academia/industry research programs and increasing industry participation in the Process Safety Consortium.

"Dave is one of the pioneers in process safety. He has made extensive contributions to the advancement of process safety concepts and technology, both within OxyChem and throughout the industry. We welcome his ideas, experience, background and – above all – the energy he puts into all his endeavors," said Dr. Sam Mannan, Center director.

Before his July 1 retirement, Willette was vice president-corporate risk and safety engineering, overseeing safety, health and risk management issues for OxyChem worldwide.

Willette's 35-year career in the chemical industry included management positions with DuPont and later Cain Chemical, acquired by OxyChem in 1988. He rose through the ranks at OxyChem, first serving as plant manager of a petrochemicals facility and later in positions that included vice president-operations/petrochemicals and vice president-operations compliance.

Willette is chairman of the North Dallas Chamber of Commerce and past state chairman of the Texas Association of Business and Chambers of Commerce. He serves on the board of the Texas Institute for Advancement of Chemical Technology, is a member of the American Institute of Chemical Engineers and is chairman of the Chemical Engineering Advisory Council at Texas A&M.

Willette earned a Bachelor's degree in chemical engineering from City College of New York and a Master’s degree from Stevens Institute of Technology.
We, at the Mary Kay O’Connor Process Safety Center appreciate the support and assistance given to us by various organizations and individuals. This support comes in many forms, without which many of the activities of the Center would not be possible. A major part of the support for various programs and activities of the Center comes from annual membership dues. Organizations can become members of the Center at the Advisor, Partner, or Sponsor level. Small business and individual memberships are also available. Details about membership benefits, membership criteria, and annual dues are available on request.

The Center recently welcomed Warren-Forthought, Inc. as one of the supporting members. Mr. Bruce Warren, Chairman and President of Warren-Forthought, Inc. presented Dr. Ray Anthony, Chemical Engineering Department Head and Dr. Sam Mannan, Director of the Mary Kay O’Connor Process Safety Center, with a check representing 1998 membership dues.

A lot of exciting things are happening at the Center. The interest and participation in our programs and activities continues to increase. The research programs are also beginning to take shape and substance. And, we have received many positive comments and suggestions after the publication of the Research Agenda which was painstakingly developed by taking into account the Executive Forum White Paper as well as the Symposium Punch List Items. The Technical Advisory Committee’s deliberations in prioritizing the itemized list for the Research Agenda was very beneficial. As time goes on, we will develop and implement research plans for each item.

Representatives from the newly formed federal agency, the Chemical Safety and Hazard Investigation Board, recently visited Texas A&M University and the Center to explore issues of mutual interest. During their visit, Dr. Phyllis Thompson and Ms. Hilary Schultz met various researchers at the Center representing such diverse backgrounds as chemical engineering, public policy, and computer science. The agency representatives were interested in learning more about the Center, especially the capabilities of the Center to develop and mine large databases and develop digital libraries which can be used to facilitate analysis and research of chemical process incidents.

The Center’s website has also gone through significant amount of change and face-lifting. We have recently added several new features. These are EMPLOYMENT, LINKS, MAILING LIST, and MEMBERS AREA. The EMPLOYMENT feature provides information and links to potential job opportunities in process safety and related fields. The LINKS feature, as the name implies, provides links to websites of an extensive list of organizations related to process safety. These organizations include governmental, academic, industry, as well as other non-affiliated organizations. The MAILING LIST is a feature which allows interested individuals to submit their contact information electronically and receive publications and information from the Center. The MEMBERS AREA is an important new feature which allows the Center to provide certain information for the benefit of the members only. More details about the EMPLOYMENT feature and the MEMBERS AREA feature are provided elsewhere in this newsletter.

M. Sam Mannan
The Mary Kay O’Connor Process Safety Center has established a software laboratory that is available to students and Center members.

The laboratory will give students the opportunity to become familiar with the very software that they will encounter within the chemical process industry. Availability of the laboratory will also bring closer the goal of providing a practical background to newly graduated engineers entering the process safety field.

The objectives for establishing the software laboratory are three-fold. First, the software and computer models can be used by students taking process safety courses to solve real-world problems. Second, graduate students can use the programs for research and analysis. Finally, the laboratory also serves a useful purpose for industry visits and continuing education courses.

Various companies have donated the process safety software that is currently available in the laboratory. The software and companies are PlantSafe® from Geosphere Emergency Response Systems, Inc., CANARY from Quest Consultants®, MocKingbird® from Warren-Forthought, Inc., ChemScreen® from APEX Safety Engineers, and DESIGN II for Windows® from WinSim, Inc.

PlantSafe® from Geosphere Emergency Response Systems is an emergency response software system, that helps incident command and emergency response personnel respond to hazmat releases, fires and other emergencies in real-time. This system is in use at petrochemical plants in the United States and Europe. PlantSafe® emergency software uses a decision-support system and contains rules and recommendations for chemical releases, fires, emergency medical, weather, and security alerts. PlantSafe® can provide up-to-the-minute advice to emergency responders in a convenient question and answer format. PlantSafe® incorporates the knowledge and experience of the user’s emergency response personnel by capturing and preserving the plant-specific knowledge of technical employees.

PlantSafe® can be used in responding to incidents of all sizes and the incident reporting system is beneficial in keeping track of accidents, injuries and emergencies and reporting them to management.

For more information, see the PlantSafe® webpage: www.plantsafe.com or call GeoSphere Emergency Response Systems at 800-430-7958 or e-mail: aslap4@aol.com.

CANARY from Quest Consultants® incorporates a series of input screens that allows the user to describe scenarios in which flammable or toxic fluid is released from a pipe, tank, process vessel, vent stack, etc. Based on this input data and the type of hazard of interest to the user, CANARY® determines which internal programs are needed to model the specified scenario, then runs the required programs in the proper sequence. The results of the calculations are presented in tabular and graphical formats that illustrate the hazard zones that would be created by the user-specified release scenario. CANARY® consequence analysis software is comprehensive, flexible, and defensible. It allows the user to directly enter mixtures with up to ten components.

CANARY® can be used for any project that requires hazard zone predictions. The hazards quantified are segregated into three primary categories, fire radiation hazards, explosion overpressure hazards and vapor cloud hazards.

For more information about CANARY by Quest®, see the webpage at: www.questconsult.com or call John B. Cornwell at 405-329-7475 or e-mail: jbc@questconsult.com.

MocKingbird® from Warren-Forthought, Inc. is a software that can be used by employees on a company network or intranet to take a training course, look up training records, or write a training course. MocKingbird® can be used to find and print a drawing, fill in a form, monitor the progress of a project, and connect to other applications. The MocKingbird® Enterprise Performance Support System is a networked application used for creating, delivering and tracking training, documents, drawings, workflows, corrective actions, audits, reviews, capital projects, and other activity that involves people and documents. MocKingbird® is a process control system for the human component of the organization.

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On October 26-27, 1998; the South Texas Section of the American Institute of Chemical Engineers is holding its Fourth Biennial Process Plant Safety Symposium at the Sheraton Astrodome in Houston, Texas. Dr. Sam Mannan is chairing the Symposium and other personnel from the Center are helping in the coordination and organization of the Symposium.

Experts from around the world will be presenting papers at the event. The exhibit part of the Symposium also presents an opportunity for the chemical process industry to showcase the latest technology available. The 1998 Symposium is the fourth in a biennial series of symposiums dedicated to process safety and risk management issues and technologies. This Symposium has gained international recognition in terms of quality of presenters and timeliness of subject matter. There are a total of 27 sessions covering such diverse issues as Risk Management Program Implementation, Y2K Issues, Facility Siting, PHA Revalidation, RAGAGEP, Plant Reliability Issues, Legal Issues and Perspectives, Safety Integrity Levels for Safety Instrumented Systems, ISO 14000 Plant Issues, Inherently Safer Design, Human Factors, Incident Investigation, Risk-Based Decision Making, Reactive Chemicals, and the latest in Relief Valve Analysis. Keynote address on the first day will be provided by Mr. Mike Mullane, Retired NASA Astronaut who will be speaking on "Lessons from the Challenger Disaster." Keynote address on the second day will be provided by Mr. Steve Mason, USEPA Region VI who will be speaking on "Implementation and Enforcement of the USEPA's Risk Management Program Rule."

To register for the Symposium, individuals may call (281) 578-9753 or fax the completed registration form to (281) 578-3272. In order to exhibit a product or services, please contact the Exhibit Chair, Mr. Stan Rubashkin at (281) 862-4881.

A complete schedule of events is available on the web at: [http://process-safety.tamu.edu](http://process-safety.tamu.edu).

The Mary Kay O'Connor Process Safety Center is in the initial stages of planning for the Center's 1999 Annual Symposium. Following a highly successful Inaugural Symposium in 1998, a lot of interest and expectation has been generated for the continuation of the Symposium.

The Center’s Annual Symposium entitled, "Beyond Regulatory Compliance: Making Safety Second Nature" is unique in that it provides a bridge between the practitioners and the academia. The objectives for holding this Annual Symposium are three-fold. First, this annual event provides the stakeholders with research reports and updates on the activities and programs of the Center. Second, the Center can help solve the complex and intriguing problems faced by the industry. Having identified these problems in discussions and forum activities at the Symposium, the tremendous expertise and resources available at the Center can be brought to bear through research and educational programs to solve the problems. Finally, this Symposium provides an independent and unbiased forum for exchange of ideas and discussion between academia, industry, regulators, and the general public.

Instead of Spring however, the 1999 Symposium will be held in the Fall on October 26-27, 1999 at the George Bush Presidential Conference Center in College Station, Texas. Similar to the Inaugural 1998 Symposium, the 1999 event is being co-sponsored by several organizations including the American Society of Safety Engineers, the Chemical Safety and Hazard Investigation Board, the US Environmental Protection Agency, the Occupational Safety and Health Administration, and the Voluntary Protection Program Participants’ Association.
The objective of the project is to develop a methodology for chemical safety program assessment and to apply the methodology in an analysis of the impact of various programs for prevention of accidental releases of reactive, flammable and toxic chemicals from stationary sources. The programs evaluated will include those required by regulatory authorities (e.g., OSHA, EPA) and industry standards (e.g., API, CMA). The phased approach establishes different segments of the program, each of which allows an opportunity to stop and reflect on how and whether or not to proceed. The four phases of this project are described as follows:

**Phase I: Describe the evolution of chemical safety**

Phase I will be focused on assessment of all available data and analysis techniques for accidental release rates. Accident release rates are expected to be available in terms of numbers of incidents, casualty losses, injuries, or other measures. Data and techniques expected to be analyzed in this phase include safety metrics developed by other organizations (both in the United States and overseas), workers compensation databases, information from major property insurers, toxic release inventory (TRI) data, accidental release information program (ARIP) data, LEPC information, and county and local government hazardous materials reporting data. Private company databases would also be scrutinized for consistency with industry reported information. The data sources and analysis techniques will be peer-reviewed before proceeding to the next phase.

**Phase II: Describe stakeholders’ goals and objectives for improving chemical safety**

The goal of Phase II will be to determine stakeholders’ goals and objectives for improving chemical safety. This will be accomplished by studying the reviewed information and applying the assessment techniques, which were acquired in Phase I. It is anticipated that a Round Table Conference (RTC) will be organized to accomplish the objectives of Phase II. Stakeholder representatives to the RTC will be provided with much of the preliminary information and analysis developed in Phase I before the RTC is held. This will ensure adequate preparation and time for input. Efforts are underway at this time to identify stakeholder representatives for the RTC. Interested individuals are requested to contact Dr. Sam Mannan at the Center for further information.

**Phase III: Develop indicators, measures, and metrics to measure progress towards goals and objectives**

The objective of Phase III will be the identification of programs and/or other factors that are responsible for the trends. Interviews and other sources might address Phase III objectives. Delphi technique on major chemical companies may be used because they are more likely to comply with all the programs. Confidential interviews will be made with companies that are not complying to determine if their safety records are worse (better) or statistically different. The analysis at this point may indicate that only

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Employee training has been a challenge ever since Henry Ford put in the first production system that produced measurably bigger profits when a worker was properly trained and skilled. Process plants now know good training is directly related to good safety performance. All employers want a fully competent, certified workforce that has no accidents. It is now possible to achieve that goal with a computerized performance support system.

Movies and Tapes

Every since Henry Ford, employers have sought a magic bullet for instant, painless, training. On-the-job training came first, of course. Soon, Instructor Led Training (ILT) was added. But ILT was (and is expensive) and produced no big profits. Then, around World War II, came the 16mm movie that put the instructor on the screen so we only had to pay that guy once and he could teach the same course for years. Still no magic (and you know why!). The next big ‘breakthrough’ was the 8mm movie. Then came the VCR, and companies invested billions in in-house video studios. But, no magic bullet yet.

Video Disc

Then, in the 1980’s came the next savior, the interactive video disc (IVD). The video disc was going to be different because it was INTERACTIVE! Wow, 40 years later we notice that if people do not interact with the world, they do not learn much. But the video disc failed to deliver the expected results and was abandoned after millions of dollars were spent creating them. The video disc had all the hype and investment, if not more, than web based training is now getting. But it was a total failure. IVD was more effective than watching a video tape, but outrageously expensive to create or update and very cumbersome to deliver.

CBT

The video disc folks then jumped to Computer Based Training (CBT) as the next salvation. This new magical technology would have all the benefits of IVD (i.e. interactivity) but a much lower cost of production. However, the production cost of a CBT course was still too high? $20,000 to $250,000. But it was easier and cheaper to make changes; the edit cost was low. But the total investment for the customer was very high. Computers are much more expensive than VCRs or video disc players.

CD-ROM

Then came the CD-ROM. It was going to solve all the problems. Computers were getting cheaper by the day and companies had already bought them to do word processing. Ship out a CD-ROM and you had instant training with no travel expenses. But this did not produce the magic bullet either! Why? It was very difficult and expensive to make changes. Plus you had to distribute a new CD to hundreds of locations, producing a jumble of polycarbonate training materials to replace the jumble of paper training materials.

LAN CBT

In the early 1990s, the local area network (LAN) became the new hot technology. So the CD-ROM material was moved to a file server and delivered over the LAN. This combination of CBT delivered over the LAN actually got some good reviews. It seems some workers were actually improving and the boss could sometimes see those improvements. What we now had was high production cost, high edit cost, low distribution cost, and enough interactivity to produce smarter, safer workers.

WBT

Then came the World Wide Web (WWW) and its private cousin, the intranet. Companies put in intranets on top of their LANs. Web Based Training (WBT) was sure to be the long sought magic bullet for training. WBT had high production cost, but low edit cost, low distribution cost and people did get trained. Only one high cost remained, production cost. But in the past year, tools like FrontPage from Microsoft enabled training writers to build a web course quickly (see www.learn2.com). So now we must have the magic bullet! But no, companies accustomed to seeing big jumps in productivity after putting in new welding machines, or new catalysts, still do not see the human equivalent.
It’s a Gigapixel World

Why is the original, time-honored, on-the-job training still used so often despite all its acknowledged flaws? The reason is reality. We see and remember gigapixels with one turn of our head. In contrast, computer delivered training presents tiny specks of reality, one megapixel at the most -- .01% of reality! It’s hard to learn when your brain is hungry for a full Thanksgiving dinner, but you are being fed crumbs. Most CBTs present screens full of words with no appetite-fulfilling pictures. But we know our brains love images. Images stick, text evaporates. CBT must offer big, high resolution pictures and as many of them as possible. Clip art, sketches, cartoons, and jerky postage-stamp video leave learners hungry.

Beyond Training

The hard reality we must face is that training alone, no matter how high-tech, is not sufficient for a company’s human resources to produce big improvements in safety or profits. To produce big increases, people must become dramatically better at doing their jobs. For this to happen, three activities must happen all the time for each employee in a company:

1. **Leap and Roar**
   Training must be available at all times. Since we are good at training dogs, lions, and seals; training people is really not that difficult. But the trained lion never spontaneously combines the on-cue roar with the on-cue leap to suddenly leap and roar at the same time during the next performance. But you certainly expect the average worker to do some spontaneous combinations, right? Why does it happen so rarely? Simple? Training alone is not enough.

2. **Continuous Learning**
   Learning must be continuous. Learning must follow training. The trained worker is now motivated to do new tricks for you, but does not have all the resources at his/her disposal to actually complete a new trick. After the training has been successful, the worker needs to LEARN at his or her own pace to truly capture the new knowledge forever in the brain cells. This learning must happen continuously and forever. The company must provide the workforce with tools and time to do this. A performance support system does this by providing instant access to any piece of the training materials at any time; by allowing practice on a simulator, by delivering historical information about similar situations; and by delivering all the related documents needed to learn and implement the solution.

   Safety training must be interweaved with all job task training to insure safety is part of the job, not an afterthought.

3. **True-Right-Now Facts**
   Fact Finding. Facts are the energy supply for the fully competent certified worker. After you have been trained, and you have truly learned how to do the new task, the fully competent worker needs to look up facts necessary to make correct and timely decisions. The certified worker has a continuous need to know what is true, right now. The refinery operator needs to know the pressure, right now. The salesman needs to know the number of widgets in inventory, right now. Where do these facts come from? They come from two sources, a real time data acquisition system and a knowledge management system. Real time data is numbers like pressure, temperature, inventory quantity, etc. Real time numbers come from the Manufacturing Resource Planning/Enterprise Resource Planning system (MRP/ERP) such as SAP R/3, or a Distributed Control System (DCS), such as Honeywell.

**Performance Support System**

The three phases of performance improvement -- training, learning, and fact finding, can be delivered by a computerized performance support system. Computers make the process safer and computers make people safer. Training, learning, and facts must be tightly inter-linked to generate the synergism necessary to produce those

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The Center recently started a MEMBERS AREA on the web (http://process-safety.tamu.edu). The intent of the MEMBERS AREA is to provide information limited to members only, both for the purpose of communicating certain information, as well as to solicit input from the members. This area is password-protected and at the present time includes the following types of information.

- Steering committee minutes
- Summaries of proposals developed by the Center
- Regulatory issues (Such as comments on proposed rulemaking, major correspondence regarding regulatory issues, regulatory updates, and the Center’s position regarding any rulemaking processes)
- Research in progress (description of ongoing research and findings. These may not be ready for publication and the Center may be seeking input from the members before publication)
- Position papers (particularly on controversial issues for which we are soliciting comments and input from our membership)
- Feedback (provided by different organizations to the Center)

The information provided in the MEMBERS AREA will be changed as needed in the future.

The Mary Kay O’Connor Process Safety Center has started a Safety Alert Series to inform Center members, industry, and the public-at-large about common safety-critical issues. From time to time, the researchers at the Center analyze safety issues that may be important to industry as well as the public-at-large. While these analyses are within the overall mission and scope of the Center, they are not selected in any organized manner. These issues may have come to our attention through individuals or organizations or they may have come from the knowledge base and experience of Center personnel. After analysis and study we have conclusions. Comments about these Safety Alerts are welcome.

The Center provides these Safety Alerts with the sincere hope that they lead to an increase of safety awareness and to a decrease of avoidable accidents. However, the Center encourages all users of this information to verify that the information is applicable to their specific circumstances. Complete descriptions of the Safety Alerts are on the Center’s website (http://process-safety.tamu.edu), while summaries appear in Centerline. Individuals requiring printed copies of the Safety Alerts may contact the Center.

The Center issued Safety Alert No. 1 on October 1, 1998. Entitled “Tire Sealants - A Bomb Looking for an Ignition Source,” the Safety Alert calls attention to the potential hazards from using tire sealants to inflate tires. Two kinds of tire sealants are sold in aerosol cans: the $5 to $10 brands that are likely to be non-flammable and contain latex sealant, and the $1 to $2 brands that contain propane, are flammable and contain no real sealant. Injuries have occurred from using the inexpensive “sealants.” Two injuries resulted from tire repairmen attempting on-the-wheel plug repairs. In each case a reamer was inserted into the tire puncture, and the tire exploded. The tire obviously contained an explosive mixture and only needed an ignition source. It is likely that sparks resulting from the reamer contacting steel belts provided the ignition source. Safety Alert No. 1 provides the technical basis for these incidents and concludes with various recommendations and cautions. The complete Safety Alert is available on the Center website or printed copies can be obtained by contacting the Center.
Researchers at the Mary Kay O’Connor Process Safety Center are involved in various research projects. Some of these projects result in publications in national and international journals and/or presentations at technical meetings. Some recent publications and presentations by Center researchers follow. More details, and in some cases, copies of these publications can be obtained by contacting the Center.


This article was contributed by Mr. Bruce Warren of Warren-Forthought, Inc. For more information about the views expressed in this article, please contact Mr. Warren at (409) 849-1239 or e-mail at brucew@mockingbird.com
The Mary Kay O'Connor Process Safety Center has started work on building an incident database for use by personnel involved in process safety and risk management activities. The Technical Advisory Committee, based on input received from the Executive Forum and the 1998 Annual Symposium, had earlier identified the lack of incident databases as a major impediment in process hazard analysis, incident investigation, and other process safety related activities (see Research Agenda - 1998). The problem is two-fold. First, compilation of process safety incidents are very hard to find. Second, the few compilations that are available are not in the public domain, or are very hard to search electronically. The database project will consist of the following tasks:

1. Compilation of incident descriptions from newspaper reports, literature reviews, and other sources. Approximately five hundred such incident reports have already been collected.

2. Development of taxonomy for the process safety incident database. The preliminary fields for the database have already been developed and the incidents are being entered into the database using Microsoft Access. The preliminary fields are:
   - Source of information
   - Dun & Bradstreet Number
   - Standard Industrial Classification code
   - Name and address of facility
   - Main product manufactured by facility
   - Release information (date, time, location, nature of release)
   - Material information (name, CAS#, concentration, state, and quantity)
   - Brief description of the incident and comments

3. Publication of the process safety incident database on the Center’s website. Access to the database will be provided to everyone free of charge.

The current database project is the first step in the development of the Center’s database capabilities in support of process safety and loss prevention. The next step envisioned in this process is the development of a comprehensive listing of different databases with varying taxonomies. An effort will then be undertaken to link these databases. Another idea under active consideration is the development of digital libraries to handle large and varying types of data.

The Center clearly sees the availability and easy access to process safety incident databases as one of the major needs for the industry. Analysis of these accident history databases provide a very intriguing insight into accident prevention activities. Accident history databases are very useful and can be a powerful tool in focusing risk reduction efforts. In addition, the conclusions can be used to systematically identify the greatest risk in terms of severity of consequences and probability of occurrence to allow prioritization of projects concerning certain processes; types of process, storage and transportation systems; and various chemicals.

The Mary Kay O’Connor Process Safety Center has started an EMPLOYMENT feature on the web (http://process-safety.tamu.edu). The EMPLOYMENT feature provides job postings, links to job postings, and other information related to potential job opportunities in process safety and related fields. The intent is to provide employers with a venue to post their job openings. In addition, it provides both graduating engineers as well as practitioners in the field with information about jobs. Employees, as well as employers routinely visit the website and therefore, the Center believes that this new feature will be of immense value and service for the process safety community. Any organization may place a job posting, announcement, or link to their internet job posting on this page, free of charge. Please contact the Center for details on such job postings.
Mockingbird® delivers a continuous cycle of training, learning and fact finding. The built-in authoring tools allow each employee to create or modify training courses and documents to keep them accurate and up to date.

For more information about Mockingbird® by Warren-Forthought, Inc. call 713-621-5905 or e-mail: brucew@mockingbird.com.

ChemScreen® from APEX Safety Consultants provides a tool for screening EPA listed hazardous materials and assessing potential worst-case scenarios. ChemScreen® is used for ensuring hazardous material screening for 40 CFR Part 68 listed materials. Hazardous materials may be screened and categorized for each process within a plant site or an entire site may be evaluated. ChemScreen® includes databanks of EPA listed hazardous materials, their chemical properties, and threshold (reportable) quantities.

ChemScreen® provides segregated reports for EPA listed toxic and flammable materials. Each report is identified by the type of material, either toxic or flammable, the process or plant site being screened, the date of the report, and the EPA listed inventories for that site.

DESIGN II for Windows® from WinSim, Inc. is rigorous simulation for chemical process industries such as Hydrocarbon, Gas Processing / Treating, Refining, Petrochemical and Pipeline Transmission. The size and complexity of the number of unit operations, streams and components in a flowsheet is limited only by the capacity of the computer on which the flowsheet is constructed.

For more information, see the WinSim webpage: http://www.winsim.com or call 713-414-6700 or e-mail: winsim@winsim.com.

Subjective conclusions are possible as compared with objective conclusions. Therefore, an assessment will be made regarding continuation to the next phases of the project.

**Phase IV: Develop Report**

The report developed in Phase IV will include the identification of information and measurements that should be gathered in the future to monitor the progress and help in further improvement of process safety. Based on the conclusions reached, recommendations will be made about programs that should be emphasized, enhanced, modified, or dropped. In addition, conclusions will be made as to what trends in the industry may lead to future problems or improvements, for example, whether TRI reporting causes companies to take actions that result in process safety improvements. Also, the report would identify any ongoing programs that would be useful considering the data that will become available in the future. Finally, the result will describe in detail the metrics and the application of the metrics in measuring the progress towards the accomplishment of national chemical safety goals.

The case studies in this project may be based on a sample that is representative of the 66,000 reporting facilities under the risk management program rule and/or based on those industries, processes, and chemicals identified as hazard concerns in the ARIP database. Another approach may be to look at narrow industry groups; such as chlorine manufacturing, ammonia, phosgene, ethylene, where there are multiple manufacturing locations (including international locations) and compare their safety records.

Partial funding for the project is being provided under a collaborative grant from the USEPA-Chemical Emergency Preparedness and Prevention Office and the Occupational Safety and Health Administration. Additional funding is anticipated from other organizations.
1998 CALENDAR

1998 Process Plant Safety Symposium
American Institute of Chemical Engineers-
South Texas Section
October 26-27 • Sheraton Astrodom Hotel • Houston, TX

Mary Kay O'Connor Process Safety Center
Technical Advisory Committee Meeting
October 28, 1998 • 10:00AM - 3:00PM
Holiday Inn-Astrodom Hotel • Houston, TX

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