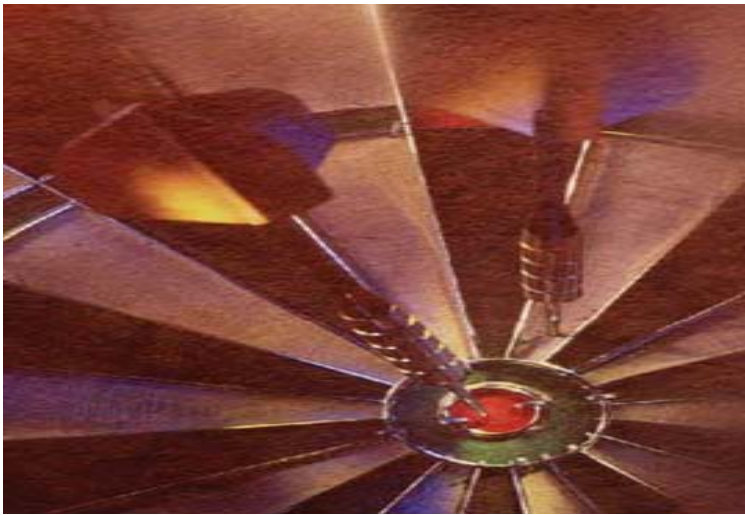




### Welcome to Chilworth Asia December 2007 Newsletter.



### QUALITY ORIENTED SERVICES TO CUSTOMERS.....A MISSION.

#### **Reactive Emergency Relief Sizing:**

Preventing overpressure in a reactive chemical system is more desirable than protecting against the effects of overpressure. However, there are circumstances where protection, with pressure relief devices such as relief valves or rupture disks and their associated discharge treatment equipment, is more cost/performance effective than prevention. Also, a prevention system may require a precise understanding of the incident scenarios, so that the proper process parameters can be monitored and managed. An overpressure protection system such as a rupture disk or a relief valve and its associated discharge management systems will function regardless of the

exact mechanism, which generated the pressure. Therefore, it is possible (although not certain) that an overpressure protection system could protect a vessel even for incident scenarios that the designers failed to anticipate.

Design of reactor emergency relief system (ERS) requires the following steps:

- Identification of potential overpressure scenarios using Process Hazard Analysis (PHA) techniques
- Evaluation of the likelihood of occurrence of the identified scenarios
- Characterization of the kinetics and thermodynamics of the reactive scenarios sufficiently to rank their severity
- Selection of the design case – the worst case (largest vent area) for which the likelihood is determined to be sufficiently high that protection is required
- More exact characterization of the kinetics and thermodynamics of the design case
- Design of the emergency relief system, including the relief device and any downstream equipment such as catch tanks, scrubbers, absorbers, flares, or stacks to safely contain or dispose of the relief device effluent
- Confirmation that any material released to atmosphere will not create an intolerable fire, explosion, or toxic risk.

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Chilworth Safety & Risk Management P. Ltd. (Chilworth) uses a specialist laboratory to characterize and quantify the propensity of reactive systems to attain runaway conditions. Chilworth also has a group of highly qualified Process Safety Specialists, who can help you to establish the design basis for emergency relief systems, sizing the ERS, interpret the test results and to use the results to determine the size of the required emergency relief system. Test equipment includes Differential Scanning Calorimeter, Accelerating Rate Calorimeter, Adiabatic Pressure Dewar, and the Mettler RC1 Reaction Calorimeter.



### Process Safety culture

IN High reliability industries, there has been an increasing recognition of the importance of the cultural and behavioral aspects of safety management.

Process Safety culture is about improving safety attitudes in people, but it is also about good safety management established by organizations with a holistic, whole of community, whole of life approach.

The UK Health and Safety Executive define Process Safety culture as “**Process Safety culture is how the organization behaves when no one is watching.**”

Historically, we have relied on incident, injury and financial data to measure the bottom line in safety, but recently we have become dissatisfied with their limitations: post-accident statistics do not tell us what we need to know to prevent the next incident. Incident statistics just measure failures after the fact; they do not identify system error or evaluate safety programs. It is now widely accepted that the most accident occurring in plant depends not just on the actions of individual employees but on the Process Safety culture of the organization.

Process Safety culture assessment & improvement is nowadays being implemented in many safety-critical environments such as oil & petroleum industries, chemical industries, aviation, and in medical domains as a means of reducing the potential for large-scale disasters, and accidents associated with routine tasks.

Process Safety culture assessment needs a multi-faceted approach. Keeping this in mind, we at Chilworth apply a three-tiered approach for measurement of the commitment of organization towards Health Safety & Environmental issues. In Process Safety culture and commitment terms the measurement indicators which could be viewed as being directly related to safety and job related training are; degrees of commitment to safety at various hierarchical levels (i.e. goal-commitment); safety vs. productivity, quality, etc., (i.e. goal-conflict); communication flows (i.e. feedback); managerial vs. operatives role functions (i.e. task complexity); and, lack of resources, workplace, job design issues, etc., (i.e. situational constraints).

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Keeping the above parameters as a benchmark, Chilworth undertakes "Process Safety culture Assessment" through a series of steps;

**Step 1:** Written Assessment

**Step 2:** Site Visits / Walk-through Surveys

**Step 3:** Personal Interviews

The resulting analysis based on the above steps provides a performance benchmark that leads to an improvement plan, setting management targets to create a safer workplace and a better environment.

### EVENTS-CHILWORTH ASIA (Second Quarter)

#### 1. Seminar On

Electrostatic Ignition Hazards- Assessment & Control" & "Dust Explosion Hazards- Prevention & Protection"

Mr. Alok Singh and Mr. Mayur Patel presented above seminars in Hyderabad and Chennai in July 2007



#### 2. Technical paper presentation in IORS 2007

**TOPIC - Significance of Process Risk Management in Oil & Gas Industry**

Mr. Vinod Wagh, Sr. Process Safety Consultant, Chilworth Asia presented technical paper in IORS 2007.



### Significance of Process Risk Management In Oil & Gas Industry

There is a move within regulatory agencies and standards making bodies towards incorporating the concepts of risk assessment into rule making. This follows a more generalized trend within many local jurisdictions and public and private corporations to utilize risk assessment in process risk management decision-making. Most risk assessment language and proposed standards are subjective by definition, lending a perception that these efforts covet junk science and statistical manipulation as they are applied to risk management decisions. Environmental, health and safety (EHS) professionals have always been challenged with maintaining compliance to prescriptive standards, and now face additional challenges in determining effective methods of organizing and implementing risk management programs driven by risk assessment requirements.

Also, fatalities, injuries, property damage and business interruption, due to inadequate risk management can cause a substantial drop in share price and loss of market share for companies. Disruption of normal business activity can cause a temporary loss of corporate direction by diverting senior management's attention from running the business to overseeing damage control.

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This paper presents several methods that are being used to successfully meet the challenges of these regulations and standards relative to their risk assessment requirements and effectively manage risk for the companies. The paper also presents a discussion of the integration of risk assessment into the design and development phase of complex equipment and systems. The paper shows how the application of a structured qualitative process risk analysis methodology, such as the identification of hazards, impact of the hazard on people property, risk rating, control measures to avoid the risk, mitigation (reducing the intensity) of the effects when risk arises through engineering methods and allow quick identification and evaluation of the main risks of the installations of a typical oil and gas production.

### UPCOMING EVENTS-

#### INTERNATIONAL SEMINARS :

Chilworth ASIA is organizing two international seminars in January 2008 at Chennai & Mumbai, the topics being:-

**“RUNAWAY CHEMICAL REACTION HAZARDS”** – Chennai  
9<sup>th</sup> January 2008

**“IEC61508/11 SIL Determination: Appreciation & Awareness”** – Mumbai 11th January 2008



### Faculty Details

**Herve VAUDREY, Ing.** ESPCI is the Technical Director for **Chilworth France**, covering all areas of process safety. Prior to joining Chilworth SARL in 2004, Hervé has worked for both Rhone-Poulenc and Rhodia for 9 years undertaking risk analysis (HAZOP, LOPA, dust explosion assessments), safety audits, accident expertise, training and process safety laboratory management.

### PROCESS SAFETY MANAGEMENT AUDIT – THE “OSHA” WAY

The Indian Chemical Industry dealing (manufacturing, storing or importing) with hazardous chemicals above a defined threshold quantity is termed as a “Major Accident Hazard” unit (MAH). These MAH’s have to comply with the statutes by getting a safety audit done by an external agency on a regular basis. The external agency generally follows the audit protocol and reviews the organizations safety systems as per the guidelines stipulated in the Indian Standard i.e. IS-14489 which is the **“CODE OF PRACTICE ON OCCUPATIONAL SAFETY AND HEALTH AUDIT”**

The organizations are gradually realizing that the value addition of these audits is minimal and the resultant is generally restricted to satisfy the statutory authorities. These organizations are gradually realizing the importance of having a robust process safety management system in place.

Hence it is essential to carry out audits/studies which can either; verify that the existing process safety management system can identify, minimize, and manage process safety risks OR establish and implement an integrated process safety management system to identify, assess, and manage process safety risks.

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The general practice among the Indian industries was to measure the safety performance through indicators such as Frequency Rate, Severity Rate, Safe-T score etc. However the companies are soon realizing that a clean record of no LTI's does not guarantee an environment devoid of any process hazards. Hence there is a remarkable shift in the general outlook by industries from "personal safety" (LTI etc.) to "process safety".

The OSHA 1910.119 is one such standard which if complied with can enable an organization to move towards an effective and sustainable process safety management (PSM) system. Guidelines are also available to identify the leading and lagging process safety performance indicators which would enable the organization to assess its actual process safety performance.

Examples of few process safety indicators which can be considered for monitoring of the process safety performance are;

Number of overdue inspections and tests,  
Number of uncontrolled releases,  
Completion of Major Accident Risk assessments,  
Overdue process safety action items,  
Overdue management of change reviews,  
Overdue incident investigations,  
Overdue inspection work requests,  
Temporary repairs,  
Critical alarm compliance.

Chilworth Safety & Risk Management P Ltd has a vast experience of conducting PSM audits and provide consultancy to organizations for installing/verifying the system. Chilworth's access to the global industrial data further assists the organization in benchmarking their safety performance to the best industries across the globe and set realistic targets and goals.

Expert's Column- Mr. Alok Singh, Sr. Consulting Engineer.

### Recent Reactive Chemical Incidents are

- Toulouse, France – Ammonium Nitrate
- Concept Sciences, Allentown, PA
- BP Amoco, Augusta, GA
- Georgia-Pacific, Pennington, AL

### What are the essentials of managing chemical reaction hazards?

- Commitment to manage hazards.
- Identification of the hazards.
- Communication of the hazards.
- Understanding the process.
- Reducing the hazards, where feasible.
- Prevention of incidents by proper design, construction, operation and maintenance
- Reducing impact of incidents that may occur

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## Classroom Training sessions/Round Table Discussion - FIRST QUARTER- 2008

TOPIC	LOCATION	MONTH
RUNAWAY CHEMICAL REACTION HAZARDS	CHENNAI	JANUARY
SIL DETERMINATION	MUMBAI	JANUARY
BEHAVIOR BASED SAFETY	NEW DELHI	FEBURARY
INDUSTRIAL ELECTROSTATIC HAZARDS	MUMBAI	MARCH
FLASH AND FIRE HAZARD ASSESSMENT & ITS IMPORTANCE	BARODA	APRIL

*Further: To learn more about CHILWORTH, visit [www.chilworth.co.in](http://www.chilworth.co.in)  
Faxback: Please fax back your queries to Marketing at + 91- 11-26135979 / 022- 66942352  
Or Email to: [info@chilworth.co.in](mailto:info@chilworth.co.in)*

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Company: ..... Address: .....  
..... Pin code: ..... Country: .....  
Telephone: ..... Fax: ..... E-mail: .....

- ✓ I would like a FREE & confidential telecon with a consultant on EHS matters
- ✓ I would like a FREE visit from a consultant next time in my area